

# JX-8P/PG-800 SERVICE NOTES

*First Edition*

## SPECIFICATIONS

## Keyboard

61 keys

### Memory Capacity

Preset	64 Patch Programs
Internal Memory	32 Patch Programs
External Memory (Memory Cartridge)	32 Patch Programs

### Output

Stereo/Mono : 5Ω  
Headphones : 8Ω, Stereo

## Dimensions

977(W) x 375(D) x 92(H) mm  
38-7/16"(W) x 14-3/4"(D) x 3-9/16"(H)

**Weight**

11.5kg  
25 lb 60 oz

## Consumption

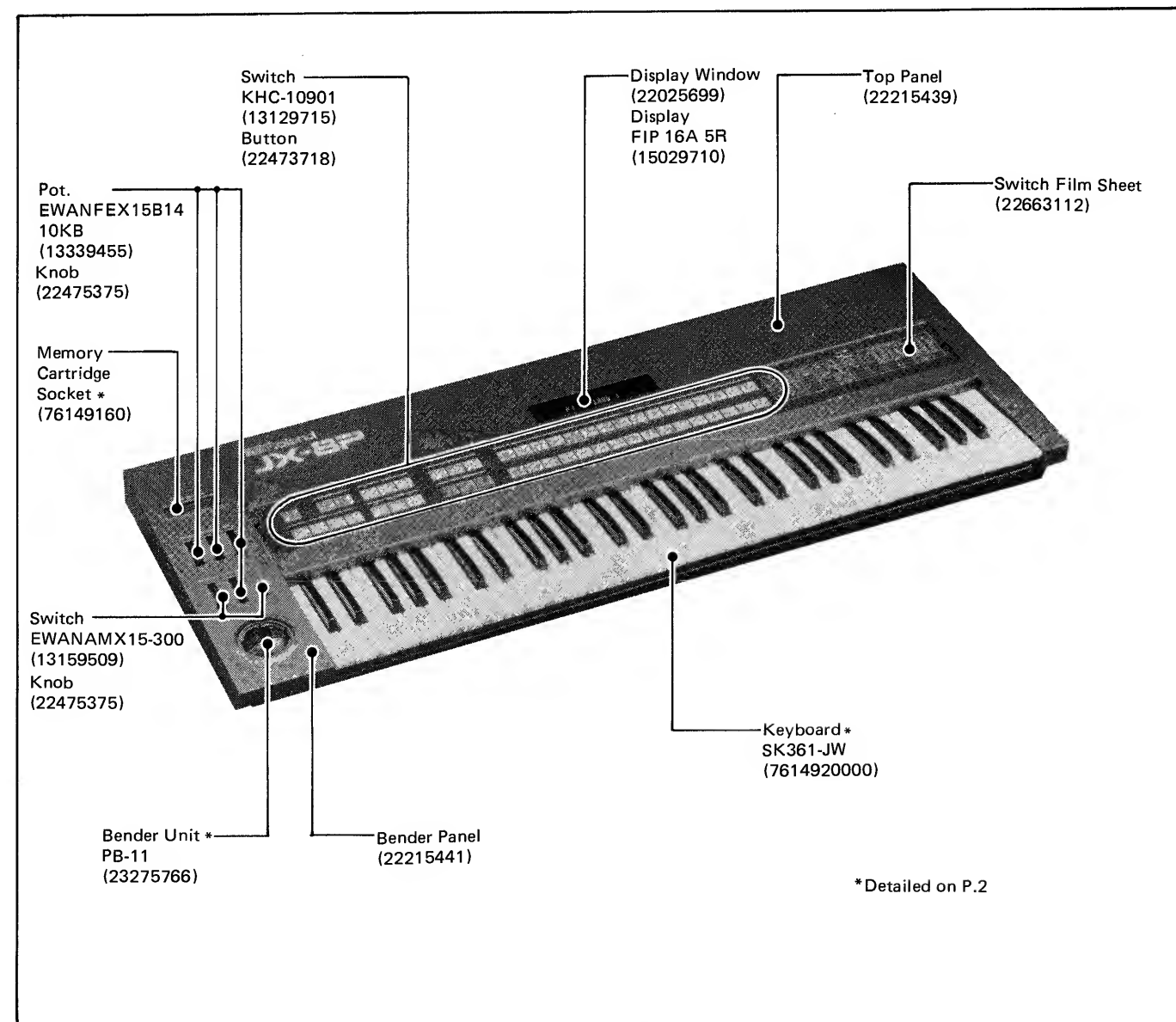
25W

## Accessories

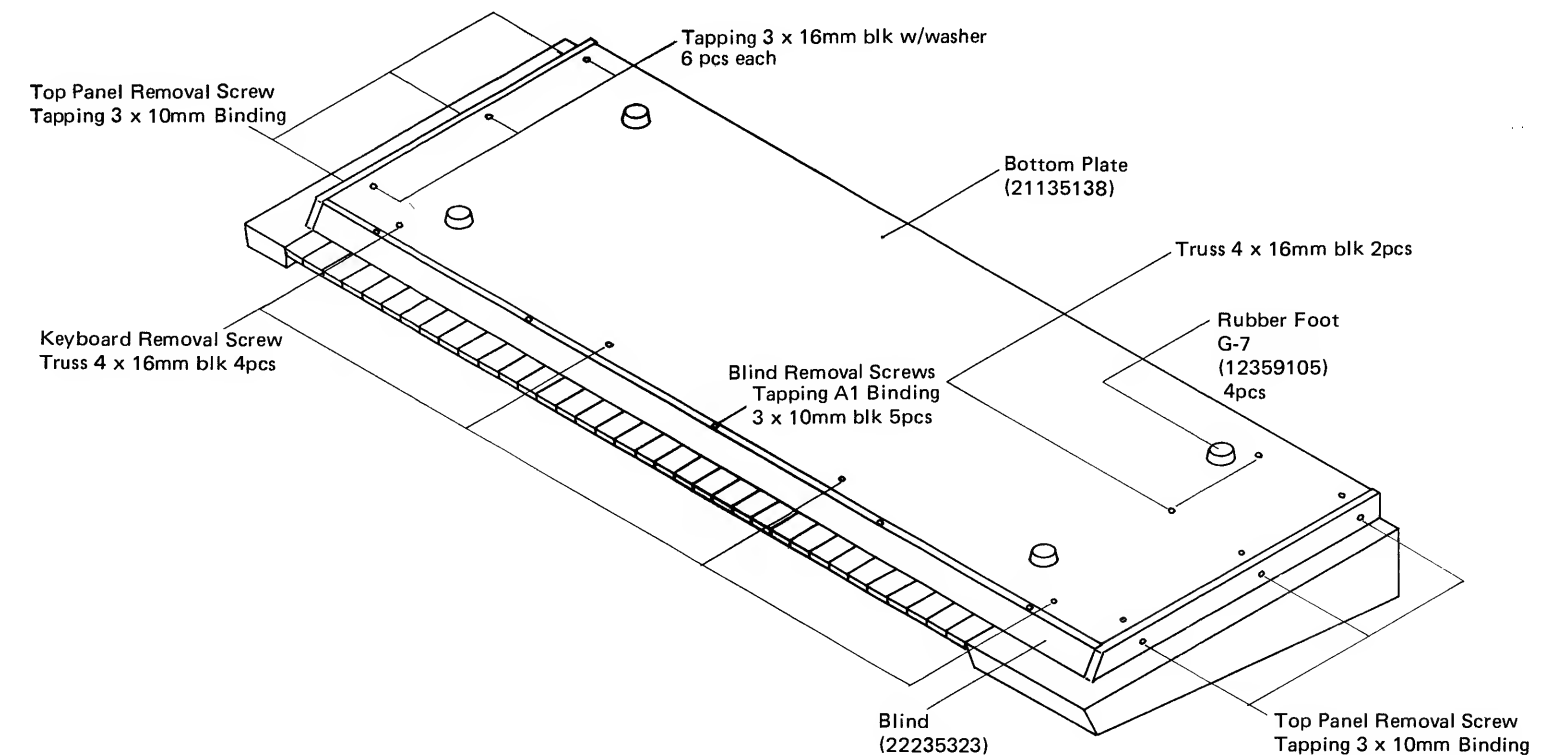
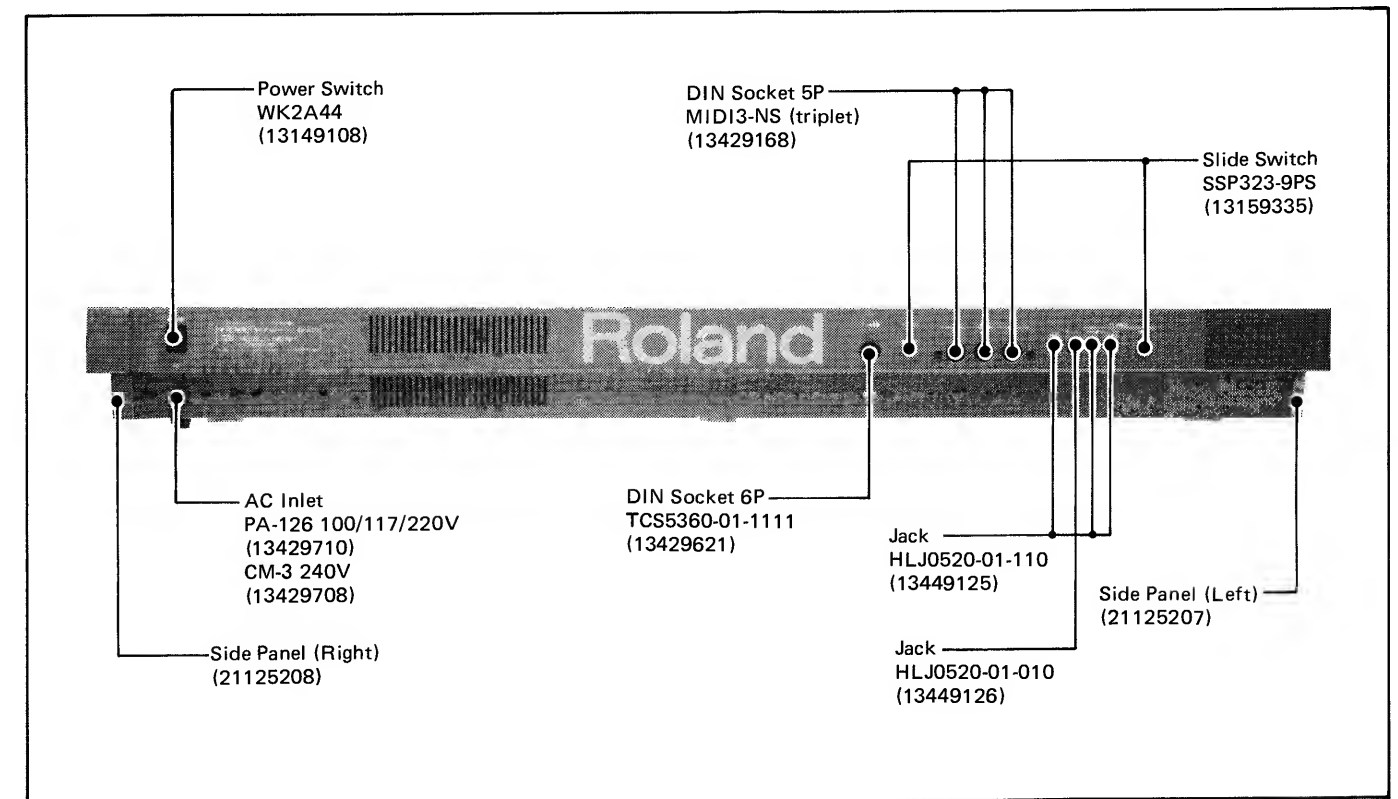
Connections Cables x 2

## Options

Programmer PG-800  
Memory Cartridge M-16C  
Pedal Switch DP-2  
Carrying Case AB-2

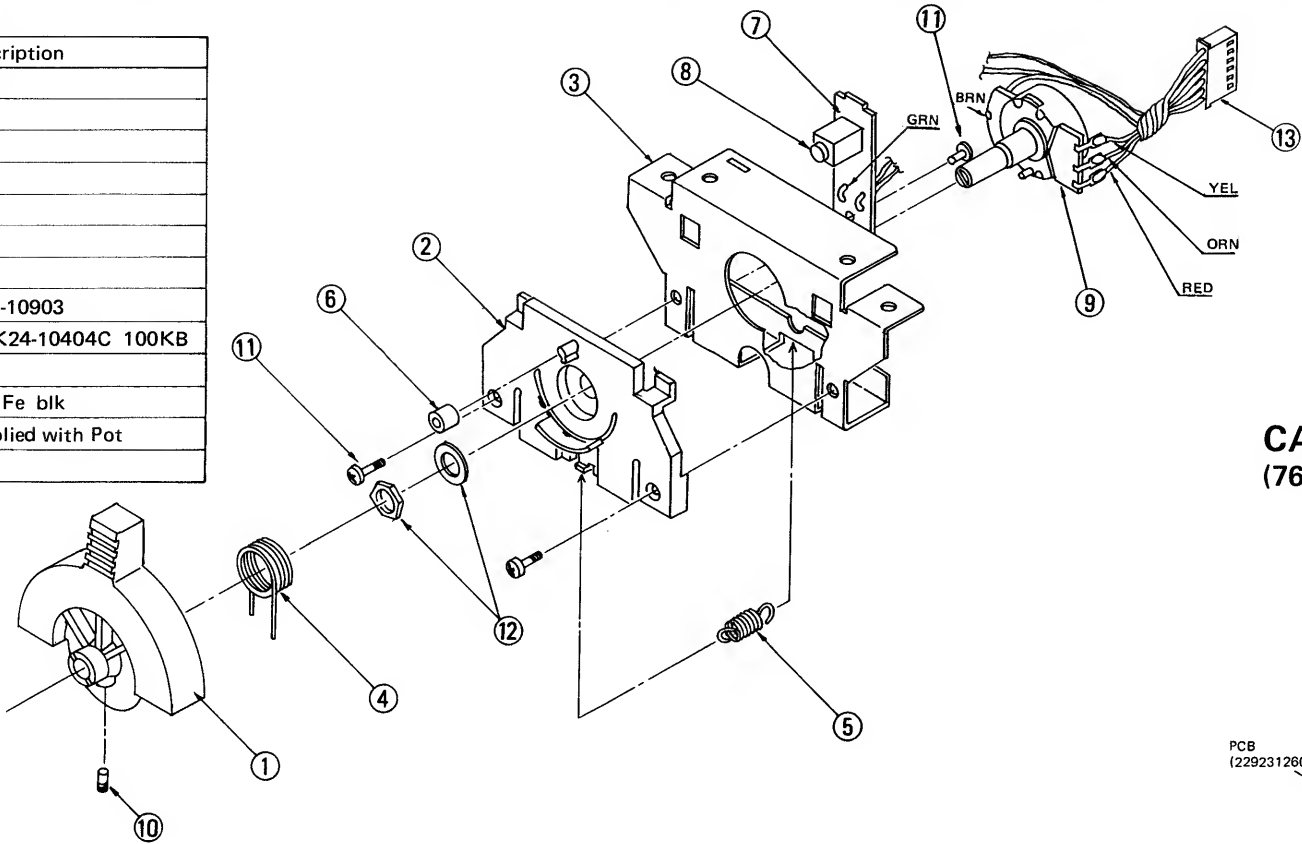


\* Detailed on P.2



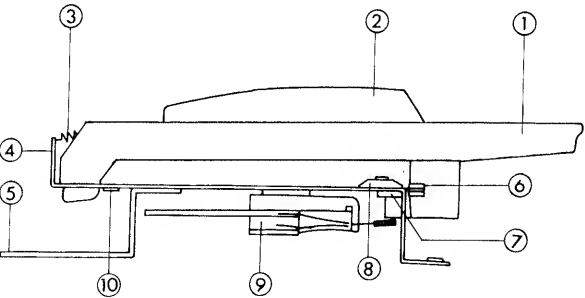
PITCH BENDER PB-11  
(23275766)

Location	Part Name	Part Number	QTY	Description
1	Lever	22145602	1	grey
2	Base	22355331	1	
3	Bracket	22285432	1	
4	Spring	22175148	1	
5	Spring	22175149	1	
6	Cushion	107H066	1	
7	PCB	22915933	1	
8	Switch	13169609	1	KEF-10903
9	Potentiometer	13259701	1	S20K24-10404C 100KB
10	Hex socket set screw		1	
11	Screw 2 x 6mm		3	Pan Fe blk
12	Volume nut/washer		1	Supplied with Pot
13	Wiring Assy E	23463912	1	

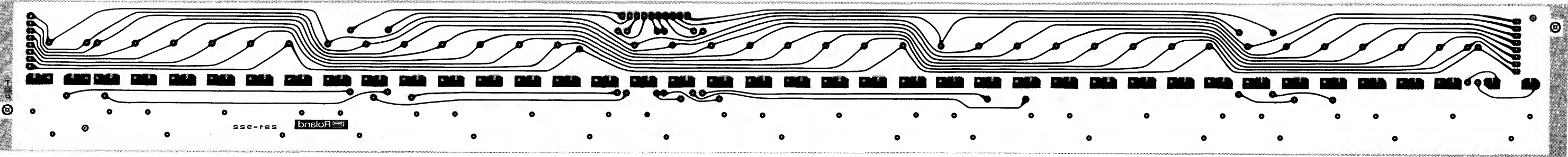
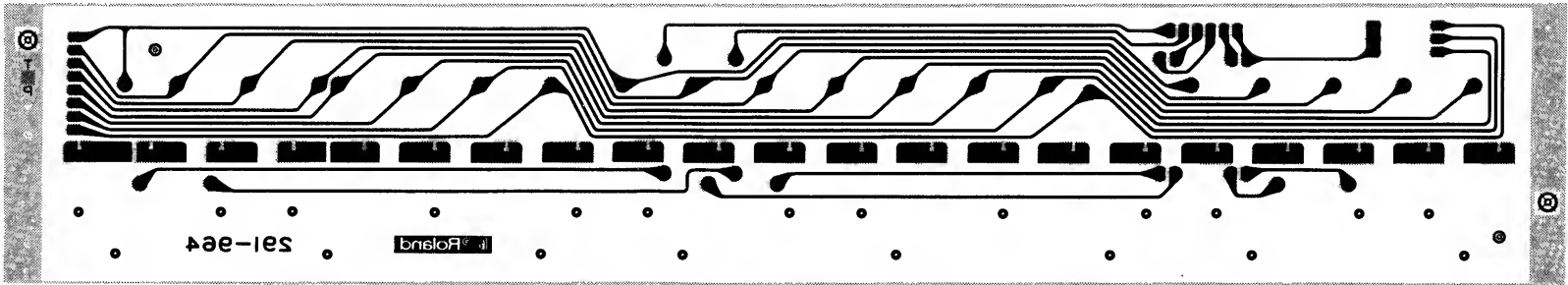
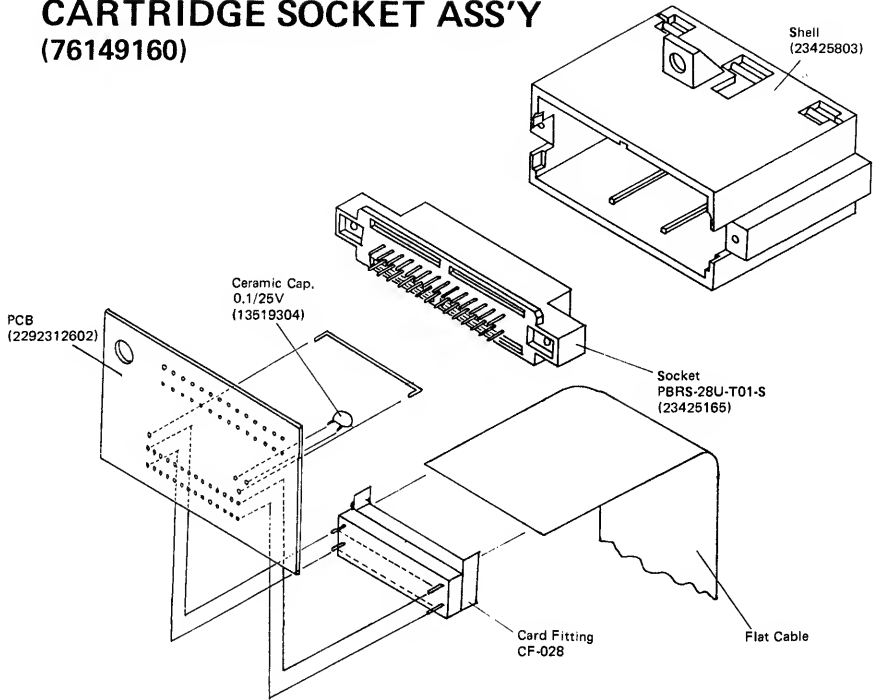


KEYBOARD SK-361-JW Parts List  
(7614920000)

1	22575136	Natural Key C, F
	22575137	Natural Key D
	22575135	Natural Key E, B
	22575138	Natural Key G
	22575134	Natural Key A
	22575139	Natural Key C, F
2	22575140	Sharp Key
3	22175132	Natural Keyspring
	22175133	Sharp Keyspring
4	22815468	Chassis
5	22035120	Chassis Stand
6	22155716	Guide Bushing
7	22265403	Level Felt
8	23165656	After Touch
9	23165652	Switch PCB 21P (pcb 291-964)
	23165653	Switch PCB 40P (pcb 291-922)
10	22135406	Key Stopper



CARTRIDGE SOCKET ASS'Y  
(76149160)



PARTS LIST (JX-8P)

PANEL, CASING		
22215439	Top Panel	
22215441	Bender Panel	
22663112	Switch Film Sheet	
22025699	Display Window	
21135138	Bottom Plate	
22235323	Blind	
21125207	Side Panel	Left
21125208	Side Panel	Right
22125166	Plate	Side Panel Holder, Right
22195519	Angle	Same for both R, L
KNOB, BUTTON		
22475375	Knob	Bender Panel
22473718	Button	KHC-10901
SWITCH		
13159509	EWA-NAM X15 300	Portamento ON/OFF, Bend Range Select
13159335	SSP323-9PS	Output Level, Memory Protect
13129715	KHC-10901	Panel, Touch
13149108	WK2A44	Power
JACK, SOCKET		
13449125	HLJ-0520-01-110	OUTPUT, HOLD
13449126	HLJ-0520-01-010	PHONES
13429168	MIDI3-NS DIN 5P (triplet)	MIDI
13429621	TCS5360-01-1111 DIN 6P	PROGRAMMER
13429710	AC Inlet PA-126	100/117/220V
13429708	AC Inlet CM-3	240V
MEMORY CARTRIDGE SOCKET		
76149160	Ass,y (including the following two)	
23425803	Shell	
23425165	PBR5-28U-T01-S	Socket
POWER TRANSFORMER		
22455355N0		100V
22455356C0 or 22455417C0		117V
22455357D0 or 22455418D0		220/240V
COIL		
12449251	DC-DC Converter	
12449229	FKOB160MH15	Line Filter
RESONATOR		
12389737	HC/U 16MHz	Crystal
12389738	CSB400P	Ceralock
PCB		
76149060	Main Board (pcb 2291399102) or (pcb 2291399104) SN530350-up	
76149130	Switch Board 1 (pcb 2292311401)	
76149100	Switch Board 2 (pcb 22923115) Splittable, including the following three PCBs: 76149120-1 Switch Board 2 (pcb 2292311502-1) 76149120-2 Volume Board (pcb 2292311502-2) 7614910 X Filter Board (pcb 2292311502-3) Order should specify Line Voltage for correct fuse value on Filter Board.	
76149180	Power Supply Board (pcb 22923112)	
POTENTIOMETER		
13339455	EWA-NFE X15 B14	
13299193	EVN-D4A A00 B54	Trimmer
13299195	EVN-D4A A00 B14	Trimmer

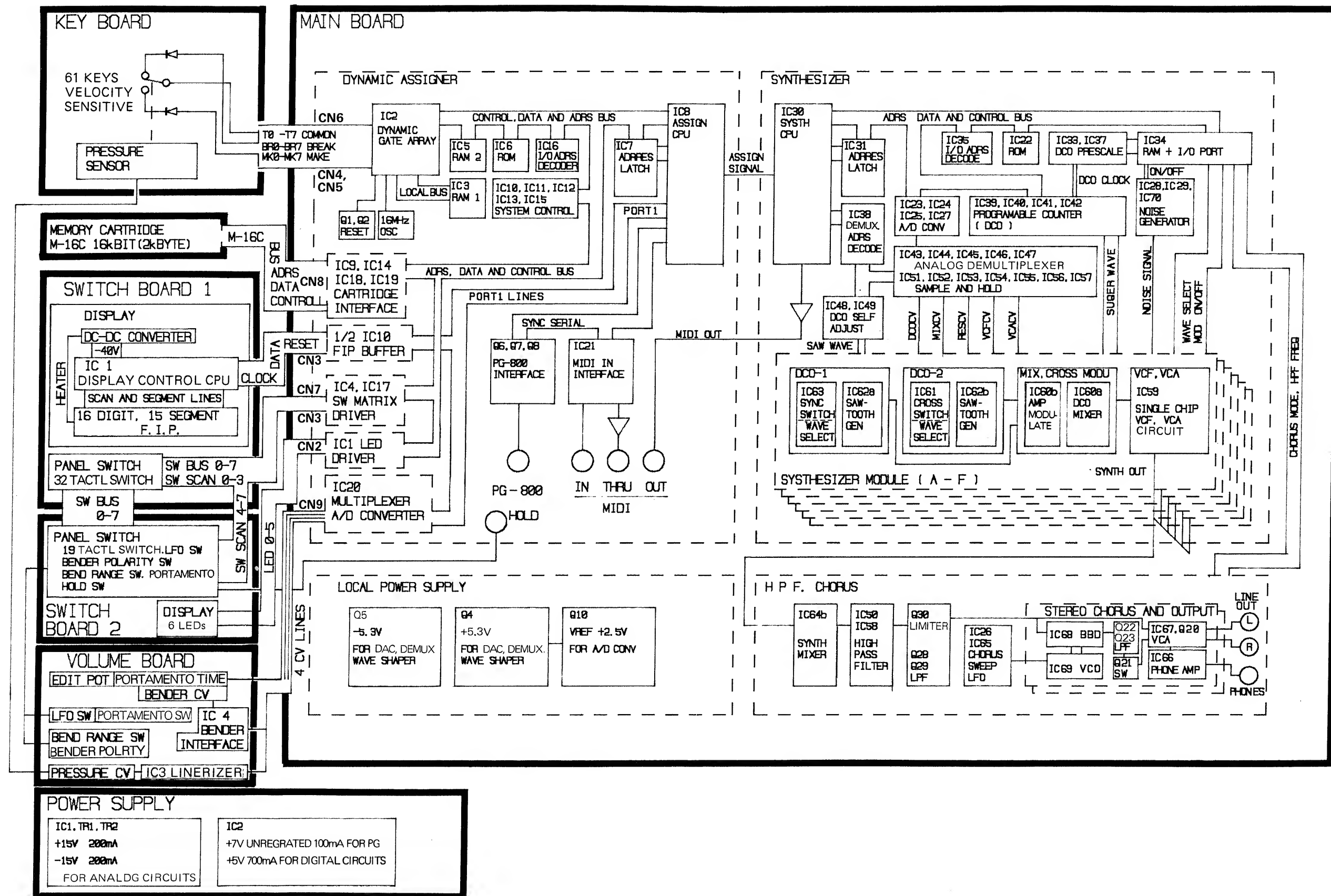
IC (Digital)	
15229824	MB63H130 Dynamic Gate Array for pcb 2291399100-2291399102
15229830	or MB63H149 Dynamic Gate Array SN530350-up or pcb 2291399103-up. Both ICs are incompatible with each other.
15179203	HD63B03 Assigner 8 bit CMOS MCU
15179319	i-8051-319 Synth 8-bit CPU
15179201	μPD7537-014 Display 4-bit CPU
15179342	HM6116-2 8-bit CMOS RAM
15179317	TC5517APL 2K byte CMOS RAM
15179110N0	μPD8253C-2 Programmable Counter
15179341	μPD8155HC 8-bit Static RAM
15219150	μPD7001C 8-bit A/D Converter
15219149	MM5437 Digital Noise Source
15179675	M5L-27128K-2 ROM A (ASSIGNER) 16K x 8, 200ns EPROM (ROM A of Ver.2.2 and below and of Ver.3.0 are incompatible with each other. See CHANGE INFORMATION).
15179674	TMM2764 ROM B (SYNTH) 8K x 8 EPROM
15179699	or M5L-2364-211P ROM B Mask ROM Upward compatible from EPROM B's of all versions since there is no difference between ROM B versions in program.
15159128H0	HD14050BP Hex Buffer
15159113H0	HD14051BP Analog Switch
15159114H0	HD14052BP Analog Switch
15159115H0	HD14066BP Quad Analog Switch
15159503	TC40H000P CMOS Inverter
15159511	TC40H174P CMOS D-FF
15159524	TC40H245P CMOS Driver
15159508	TC40H373P CMOS Latch
15169304H0	HD74LS04P Hex Inverter
15169308H0	HD74LS30P 8-input NAND
15169339H0	HD74LS32P Quad OR
15169318H0	HD74LS138P Decoder
15169321H0	HD74LS161P Counter
15169322H0	HD74LS174P Hex D-FF
15169327H0	HD74LS367P Hex Buffer
15169301H0	HD74LS00P Quad NAND
15169304H0	HD74LS04P Hex Inverter
IC (Analog)	
15229826	IR-3R05 VCF-VCA Pack
15219213	MN-3009 BBD
15169504	MN-3101 BBD Driver
15189105	μPC4558C OP amp
15189154	TL-064 Quad OP amp
15189136	M5218L OP amp
15199117	M5230L V-regulator
15199106	μPC7805 5V Regulator
TRANSISTOR	
15119106	2SA733Q
15129107	2SC945Q
15119108	2SA798G dual transistor
15129613	2SD1207
15119815	2SB834Y or 15119814 2SB1015 or 15119819 2SB507
15129201	2SD880Y or 15129827 2SD1406 or 15129820 2SD313
15139103	2SK30A-GR
15129107	2SC945Q
	Gm selected for Q15, Q16 and Q19 of Main Board VCF/VCA Module; dotted in Red, Orange, Yellow or Green. 18 2SC945Q (3 for each voice) on a given Main Board should be of the same color dot for reproducing uniform timbre.
15119133	DTA114 digital transistor
15129150	DTC114 digital transistor
DIODE, LED, PHOTO COUPLER	
15019125	1SS-133
15019143	1SS-116

15019607	05Z6.2X	zener
15019603	05Z9.1Z	zener
15019605	05Z43Y	zener
	04AZ3.0	zener
15229706	TLP-552	photo coupler
15029177	GL-5HD5	LED
15029710	FIP 16A 5R	fluorescent indicator
15019236	W02	rectifier bridge
RESISTOR		
13919335	RGLD 6 x 102J	1K x 6 array
13919146	RKM14L503F	R-2R D/A array
13919313	RMLS 8-104J	100K x 8 array
13919308	RMLS 6-103J	10K x 6 array
13919310	RMLS 8-103J	10K x 8 array
13919321	RML13-103J	10K x 13 array
13799710D0	CRB20FX 10kΩ	metal oxide
13799725D0	CRB20FX 330kΩ	metal oxide
13799724D0	CRB20FX 6.8kΩ	metal oxide
13799723D0	CRB20FX 4.7kΩ	metal oxide
13769173K0	SN14K2EF 10kΩ	metal oxide
13769182K0	SN14K2EF 24kΩ	metal oxide
13769161K0	SN14K2EF 3.3kΩ	metal oxide
15229921	ERSA33G561T 560Ω	posistor
CAPACITOR		
13529104	DE7150F472MVA1	line bypass
13549216Y0	0.01μF 50V, G (±2%)	film
13529116	DD107SL221G50V	220pF, 50VG
FUSE, FUSE HOLDER		
12559336	GG5 2A	100/117V
12559508	CEE T250mA	220/240V
12199552	UF0005-02	fuse holder
CONNECTOR HOUSING		
13439266	5267-10A	
13439267	5267-12A	
13439277	5267-14A	
13439261	5267-04A	
13439285	5268-03A	
13439272	5268-04A	
13439273	5268-06A	
13439270	5268-08A	
13439274	5268-09A	
13439276	5268-12A	
13439280	Card Fitting CF-028	
AC CORD, CORD SET		
13439801	PVFF 2.5m	100V
13439812F0	VC-704-J01	117V
13439813F0	EC-210-J01	220V
13439814F0	SC-415-J06	240V 3P, Australian
13436846	BH-301-J01	240V 3P, England
OTHERS		
12569149	Lithium Battery BR2325-HC	
22463129	Heat Sink 246-129	
2216353401	FIP Spacer	
22253118	Bender Shield Cover	
2225311901	Shield Cover	
22263309	Cushion	
2224345202	Slide Pot Cover	
2267350201	Cover 267-502	
2202569902	FCD Cover 202-699	display window
23275766	Bender PB-11	
1347915901	Sumi Card	
	SMCD28x800-BD10 P1.25	flat cable
23463908	Wiring Ass'y A	
23463909	Wiring Ass'y B	
12369504	Cord Bushing SR-4N-4	100V
22193728	Cord Holder	100V

## BLOCK DIAGRAM

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39

A  
B  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M  
N  
O  
P  
Q  
R  
S  
T  
U



CIRCUIT DESCRIPTION

The major circuits of the JX-8P on the Main Board are classified into two by their function: Assigner and Synthesizer, each has the dedicated CPU.

ASSIGNER

This section is further devided into two; Interface and Assigner. Interface deals with MIDI communication and reads information from the keyboard, panel controls, memory cartridge, programmer PG-800, etc. Assigner allocates each module (a pair of voices) to a key being played on the built in or MIDI keyboard.

SYNTHESIZER

This section contains 6 2-voice synthesizer modules and is very simillar to those found on Roland JX-3P, MKS-30 and GR-700 in circuit configuration. As those circuits are repeated on Service Notes of those brother models, not covered in this Notes.

ADJUSTMENT

JX-8P is provided with built-in test program which runs only in the test mode.

ENTERING TEST MODE

- 1. While pressing TONE PIANO 2 and PIANO 3, switch the power ON.
- 2. When the display has read [P1 PIANO 1 ], verify that repeating a key will light KEY MODE and AFTER TOUCH buttons one by one while continuously half-lighting POLY. A full-lit button indicates the module currently assigned to a key as shown below.

SOLO . . . . .	A	VOLUME . . . . .	D
UNISON . . . . .	B	BRILLIANCE . . . .	E
POLY . . . . .	C	VIBRATO . . . . .	F

CREATING THE TEST TONE

**CAUTIONS:** Allow at least five minutes for warm-up before proceeding to adjustment.  
Do not use PG-800 in this mode.

- 1. Press EDIT PARAMETER. The display will read [11 DC01 RANG 16’].
- 2. Set the following parameters to the value respectively by selecting a TONE number and resetting EDIT knob. The parameters not listed will not affect the procedure.

NUMBER	PARAMETER	VALUE
11	DCO 1 RANG	8’
12	DCO 1 WF	SQUR
13	DCO 1 TUNE	00
14	DCO 1 LFO	0
15	DCO 1 ENV	0
41	MIX DCO 1	99
42	MIX DCO 2	0
43	MIX ENV	0
52	VCF FREQ	54
53	VCF RES	99
54	VCF LFO	0
55	VCF ENV	0
56	VCF KEY	0
61	VCA LEVEL	70
62	VCA MODE	GATE
64	CHORUS	OFF

ADJUSTING

- 1. Connect the scope to the OUTPUT jack or TP5 of the MAIN BOARD.
- 2. Press A above middle C — 442Hz.
- 3. Adjust the trimmer of the module being indicated by the lit LED so that the waveform shows its full amplitude.
- 4. In a similar way adjust the remaining modules but press the A key for each module.
- 5. When the adjustment has finished, return to the normal mode by pressing MASTER TUNE or switch the power off.

調整仕様

JX-8Pには調整用プログラムが内蔵されています。このプログラムはテストモードにしな  
いと走りません。

テストモード

- 1. PIANO 2,3を同時に押しながら電源を入れます。  
JX-8Pはテストモードとなり,「P1 PIANO1」が表示され, KEY MODEの POLYが点灯  
します。
- 2. 鍵盤を弾くごとに KEYMODE, AFTER TOUCH のいずれかの LED が点灯します。  
LED とモジュールの対応は英文中の表の通りです。POLY (連続半点灯) は対応したモ  
ジュールがアサインされた場合, 一段と明るくなります。

調整用音色

テスト音を下記の手順で設定します。  
注. PG-800は使用しないこと。  
電源ON後約5分待つこと。  
1. EDIT PARAMETERを押す。「11 DCO1 RANG 16」が表示されます。  
2. 英文中の指示値にパラメータを設定する。指示の無いパラメータは無関係です。

調整

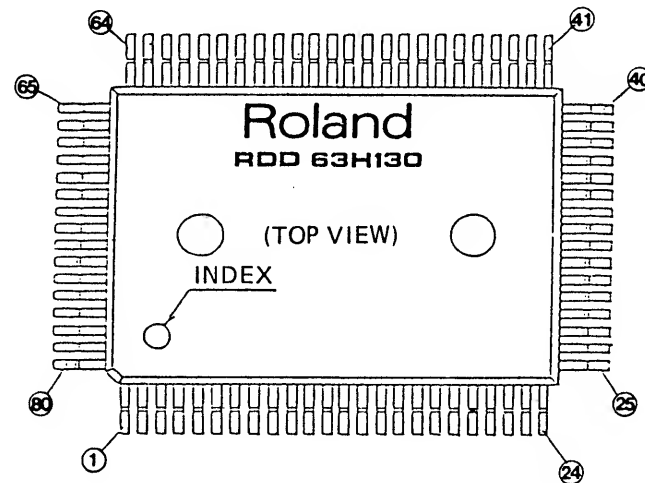
- 1. オシロスコープを OUTPUT ジャック, またはメイン基板の TP5 に接続します。
- 2. A4 (442Hz) キーを押します。
- 3. 現在アサインされているモジュールを KEY MODE/AFTER TOUCH LED で確認, その  
モジュールの半固定を調整して出力を最大にします。
- 4. A4 キーを押し直し, 別のモジュールを同様に調整して行きます。
- 5. 調整終了後ノーマルモードに戻るには MASTER TUNE を押すか, 電源を一旦 OFF に  
します。



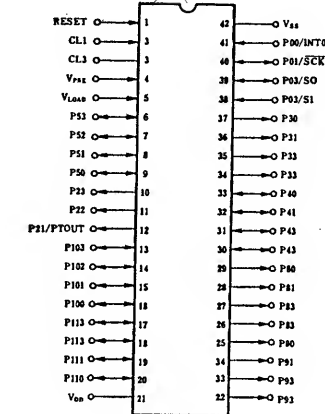
## IC DATA

## MB63H130

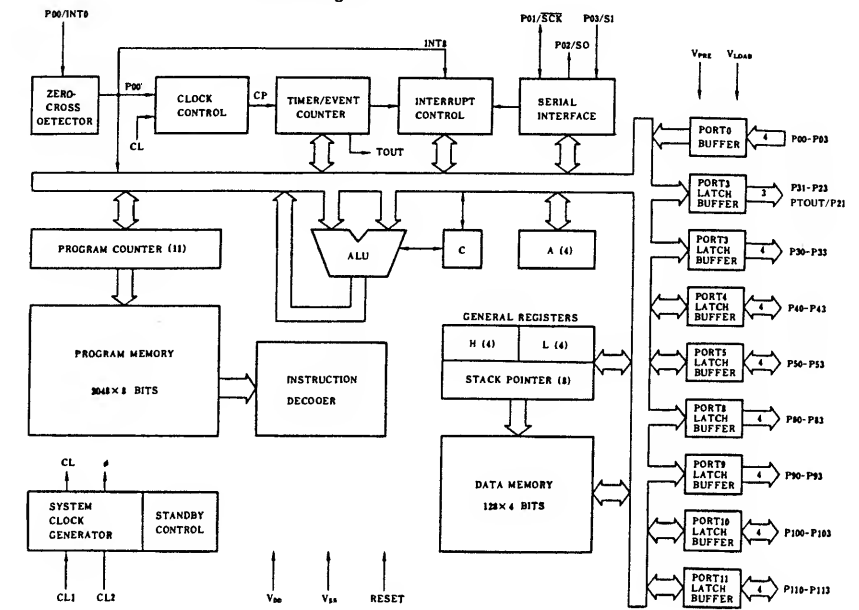
## Pin Assignment



Pin no.	I/O	Pin name	Pin no.	I/O	Pin name	Pin no.	I/O	Pin name	Pin no.	I/O	Pin name
1	O	T7	21	I	BR9	41	I	CD7	61	O	RA1
2	I	BR0	22	I	MK9	42	I	CA8	62	O	RA10
3	I	MK0	23	I	BR10	43	I	CA9	63	O	RA2
4	I	BR1	24	I	MK10	44	I	CA10	64	I/O	ROE
5	I	MK1	25	I	RES	45	I	CS	65	O	RA3
6	I	BR2	26	I	E	46	I	XT1	66	O	RWE
7	I	MK2	27	O	EXCK	47	O	XT2	67	O	RA4
8	I	BR3	28	I	AS	48	O	ASEL	68	O	RA9
9	I	MK3	29	O	CRES	49	I	MOD1	69	O	RA5
10	I	BR4	30	I	CRNW	50	I	MOD2	70	O	RA8
11	I	MK4	31	O	SRCK	51	I/O	RD3	71	O	RA6
12	-	VSS	32	-	NC	52	-	VSS	72	O	RA7
13	I	BR5	33	-	VDD	53	I/O	RD4	73	-	VDD
14	I	MK5	34	I/O	CD0	54	I/O	RD2	74	O	T0
15	I	BR6	35	I/O	CD1	55	I/O	RD5	75	O	T1
16	I	MK6	36	I/O	CD2	56	I/O	RD1	76	O	T2
17	I	BR7	37	I/O	CD3	57	I/O	RD6	77	O	T3
18	I	MK7	38	I/O	CD4	58	I/O	RD0	78	O	T4
19	I	BR8	39	I/O	CD5	59	I/O	RD7	79	O	T5
20	I	MK8	40	I/O	CD6	60	O	RA0	80	O	T6

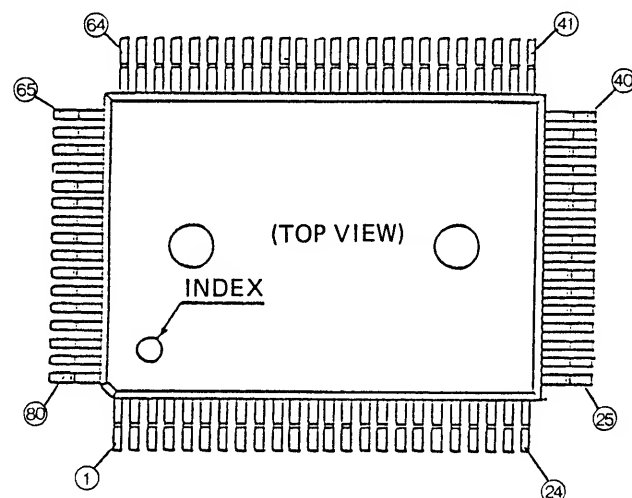
 $\mu$ PD7537CPin Configuration  
(Top View)

## Block Diagram

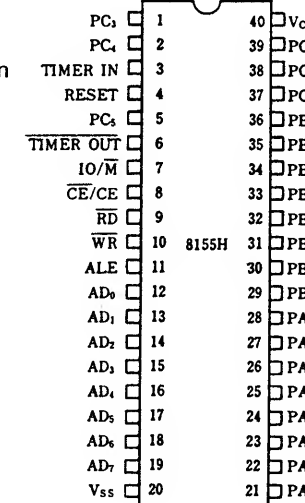


## MB63H149

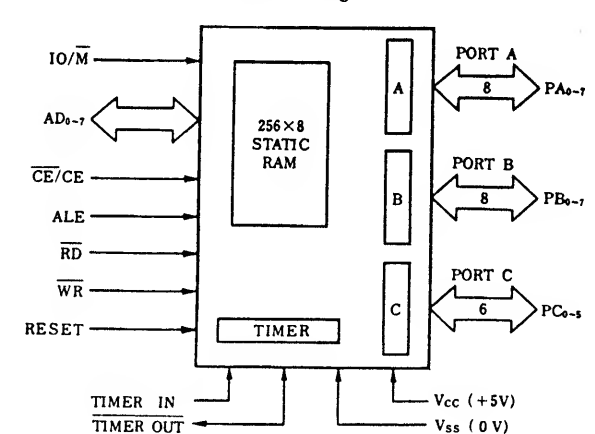
## Pin Assignment



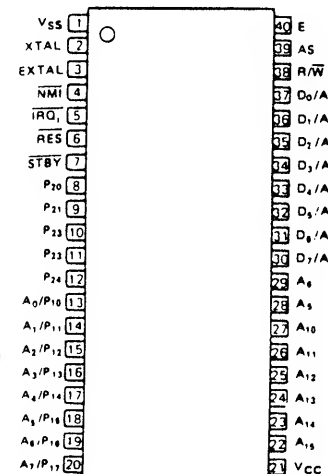
Pin no.	I/O	Pin name	Pin no.	I/O	Pin name	Pin no.	I/O	Pin name	Pin no.	I/O	Pin name
1	O	T7	21	I	BR9	41	I/O	CD7	61	O	RA1
2	I	BR0	22	I	MK9	42	I	CA8	62	O	RA10
3	I	MK0	23	I	BR10	43	I	CA9	63	O	RA2
4	I	BR1	24	I	MK10	44	I	CA10	64	I/O	ROE
5	I	MK1	25	I	RES	45	I	CS	65	O	RA3
6	I	BR2	26	I/O	EXCK	46	I	XT1	66	O	RWE
7	I	MK2	27	I	E	47	O	XT2	67	O	RA4
8	I	BR3	28	O	INT	48	O	ASEL	68	O	RA9
9	I	MK3	29	I	AS	49	I	MOD1	69	O	RA5
10	I	BR4	30	O	CRES	50	I	MOD2	70	O	RA8
11	I	MK4	31	I	CRNW	51	I/O	RD3	71	O	RA6
12	-	VSS	32	O	SRCK	52	-	VSS	72	O	RA7
13	I	BR5	33	-	VDD	53	I/O	RD4	73	-	VDD
14	I	MK5	34	I/O	CD0	54	I/O	RD2	74	O	T0
15	I	BR6	35	I/O	CD1	55	I/O	RD5	75	O	T1
16	I	MK6	36	I/O	CD2	56	I/O	RD1	76	O	T2
17	I	BR7	37	I/O	CD3	57	I/O	RD6	77	O	T3
18	I	MK7	38	I/O	CD4	58	I/O	RD0	78	O	T4
19	I	BR8	39	I/O	CD5	59	I/O	RD7	79	O	T5
20	I	MK8	40	I/O	CD6	60	O	RA0	80	O	T6

 $\mu$ PD8155HCPin Configuration  
(Top View)

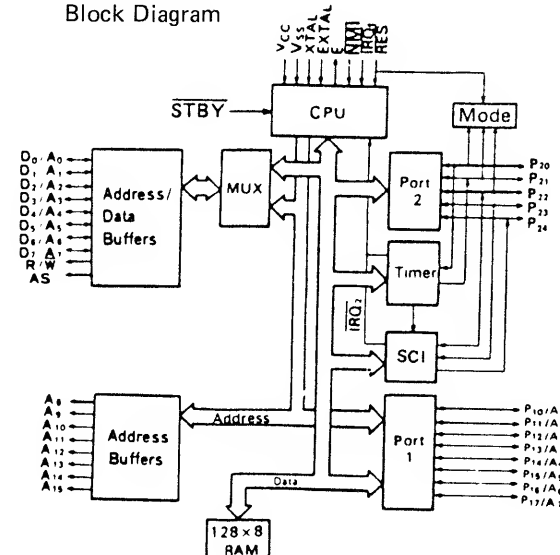
## Block Diagram



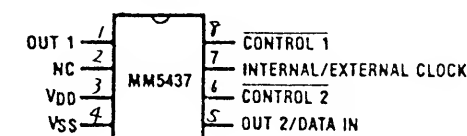
## HD63B03RP

Pin Configuration  
(Top View)

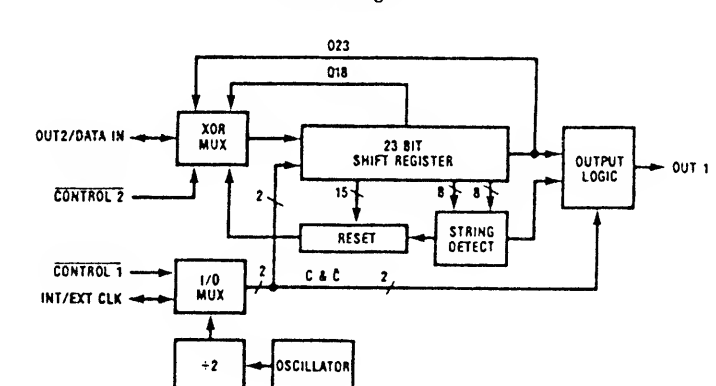
## Block Diagram



## MM5437

Pin Configuration  
(Top View)

## Block Diagram



## CHANGE INFORMATION

Since the release of the JX-8P some engineering changes have been made to improve the performance and reliability of the unit.

## MAY. 1985

EFFECTIVE SN 実施番号	DESCRIPTION	変更内容 (理由)	MAIN BOARD ASSEMBLY	GATE ARRAY IC2 MAIN BOARD	ROM A IC6 MAIN BOARD	ROM B IC22 MAIN BOARD
480300	<div><div><div><div>IC2 MB63H 130</div><div>IC6 27128</div><div>IC16 LS138</div><div>IC10 LS138</div><div>IC12 LS138</div></div><div>CS45</div><div>CE20</div><div>Y411</div><div>Y69</div><div>Y77</div><div>Y111</div><div>Y1212</div></div></div> <p>Operational speed of ROM A is somewhat low when compared with that of the CPU IC8 HD63808 and the ROM sometimes misses access to its memory cells, causing program runaway; the phenomenon will be no display or no sound.</p> <p>As a solution CE is advanced by bypassing IC16 to provide the ROM with more accessing time margin. In field service changing to a high speed ROM M5L2712K-2 is recommended for easier improvement with no CE reconnection.</p> <p>The high speed ROM is implemented at the factory with SN514700 for double safety.</p>	76149060 pcb 2291399102	MB63H130	M5L27128K Ver. 1.1	TMM2764 Ver. 1.1	Although the software in ROM B remains unchanged, its revision number is updated in pace with that of ROM A to avoid confusion around version number.
480420	<p>Pressing HOLD Pedal while After Touch is On also holds A.T. effect via MIDI message on a downstream synthesizer. The effect continues on the subsequent notes even they are played after the release of the pedal. ROM A of Ver. 2.0 cures this problem.</p>	アフター・タッチON時にHOLDペダルを踏むと、下流へのMIDIキー信号に対するアフター・タッチ効果は、ペダルを離した後も解除されない。ROM A Ver.2.0を使用すればこの現象は生じない。		M5L27128K Ver. 2.0	TMM2764 Ver. 2.0	
480589	<p>The software in PROM A of Ver. 2.1 allows the modules to increase the total volume of the voice outputs. Also the software recognizes MIDI Program Change message after receipt of MIDI Local OFF message.</p>	ROM A Ver.2.1を使用すれば音量が増加する。また、MIDI ローカルOFFメッセージ受信後でもプログラム・チェンジ・メッセージの受信が可能となる。		M5L27128K Ver. 2.1	TMM2764 Ver. 2.1	
490600	<div><div><div><div><div><div>Q4 2SD571L</div><div>R30 15K</div><div>R21 330</div><div>C32 10/16</div><div>C33 10/16</div><div>D3 10/16</div><div>C29 47/16</div><div>Q5 2SB605L</div><div>R28 560</div><div>R29 330</div><div>C30 10/16</div><div>C28 47/16</div><div>Vref</div><div>-Vref</div></div><div>Q4 2SD313 or 2SD880</div><div>R31 560</div><div>R32 330</div><div>C32 10/16</div><div>C33 10/16</div><div>D3 10/16</div><div>C29 47/16</div><div>Q5 2SB507 or 2SB834</div><div>R28 560</div><div>R29 330</div><div>C30 10/16</div><div>C28 47/16</div><div>Vref</div><div>-Vref</div></div></div></div><p>This change conforms to the requirement placed by some specification. Counterparts in both original and revised circuits are interchangeable if R28-R31 are so arranged to the diagram.</p><p>安全規格に適合させるため。 左図のドラフツスタを右図のものに置換える場合には、R28-R31の定数変更も同時に行う必要がある。</p></div>	6149060 pcb 2291399103 or pcb 2291399104	M5L27128K-2 Ver. 2.2	TMM2764 Ver. 2.2	TMM2764 Ver. 3.0	
528250	<p>Attempt to write into Preset Bank results in error message displayed as "SELECT BANK C!". However, this message would not be displayed if WRITE button is pressed while Preset B [-P...] Bank is selected. PROM A ver. 2.2 cures this problem.</p>	プリセット・バンクへ書き込みを行おうとすると、エラーメッセージ「SELECT BANK C!」が表示されるが、プリセットがBバンクの場合表示されない。ROM A Ver.2.2を使用すれば、エラーメッセージが正しく表示される。		M5L27128K-2 Ver. 3.0	TMM2764 Ver. 3.0	
530350	<div><div><div><div>IC2 MB63H 130</div><div>IC6 27128</div><div>IC16 LS138</div><div>IC10 LS138</div><div>IC12 LS138</div></div><div>CS45</div><div>CE20</div><div>Y411</div><div>Y69</div><div>Y77</div><div>Y111</div><div>Y1212</div></div></div> <p>VREF circuit is modified to have adjustable positive voltage (+5.6V).</p> <p>基準電圧回路を調整可能型 (基準電圧5.6V) に変更。</p>	<div><div><div><div>IC2 MB63H 149</div><div>IC6 27128</div><div>IC16 LS138</div><div>IC10 LS138</div><div>IC12 LS138</div></div><div>CS45</div><div>CE20</div><div>Y411</div><div>Y69</div><div>Y77</div><div>Y111</div><div>Y1212</div></div></div> <p>VREF circuit is returned back to the previous configuration with some mounting holes for trimmer, transistor, etc. made idle.</p> <p>NOTE: VREF differs between fixed and adjustable ones since their temperature coefficients are of opposite direction.</p> <p>固定式でも十分な電圧精度が保たれることが確認されたので再び旧回路へ変更。 注：固定型と調整型とは回路の温度係数が異なるため基準電圧も異なる。</p>		M5L27128K-2 Ver. 3.0	TMM2764 Ver. 3.0	(EPROM)
543050	<p>ROM B of EPROM is replaced by a cost effective mask ROM.</p> <p>ROM BをEPROMからMASK ROMに変更、但し、プログラムの内容は変わらない。</p>				M5L2364-211P (MASK ROM)	

the TV on keyboard sometimes generates incorrect MDI OUT message upon HOLD pedal OFF as exemplified below.

Pressing HOLD Pedal ON and OFF with AFTER TOUCH ON while depressing any key on the J.A.-of key board sometimes generates an error. Must always be 7F, but varies with AFTER TOUCH knob setting and Key Pressure. FF = System Reset; this will be generated when the amount of AFTER TOUCH and key pressure are at maximum.

554250

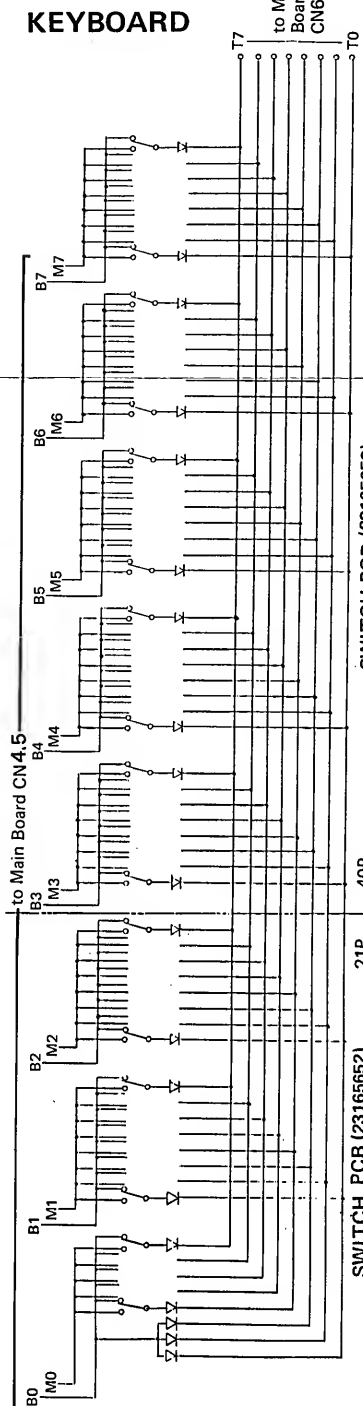
90 40 51 DO 80 DO 7F B0 40 7F DO FF B0 40 00

(7F)

アフター・タッチON時に増設を押し続けながら、HOLDペダルをON、OFFさせることで、ペダルOFF時に7Fではアフター・タッチが、ペダルの位置によって出される場合がある。このアタッチは、アタッチの位置、および押強さによって異なる。上例は、両方共に最大の場合である。ROM A VER. 3. 1に交換すれば解決する。但し、ROM A VER. 2. 2以前のROM A は互換性が無いので、VER. 2. 3を使用すること。

MUSIC REST And TOP PANEL  
Music Rest is furnished on later products. Effective Serial Number is not fixed on the day of the issue.  
諸面立てを追加する。実施製番は本サービスノ——発行時点では未定。

## MAIN BOARD ASSIGNER

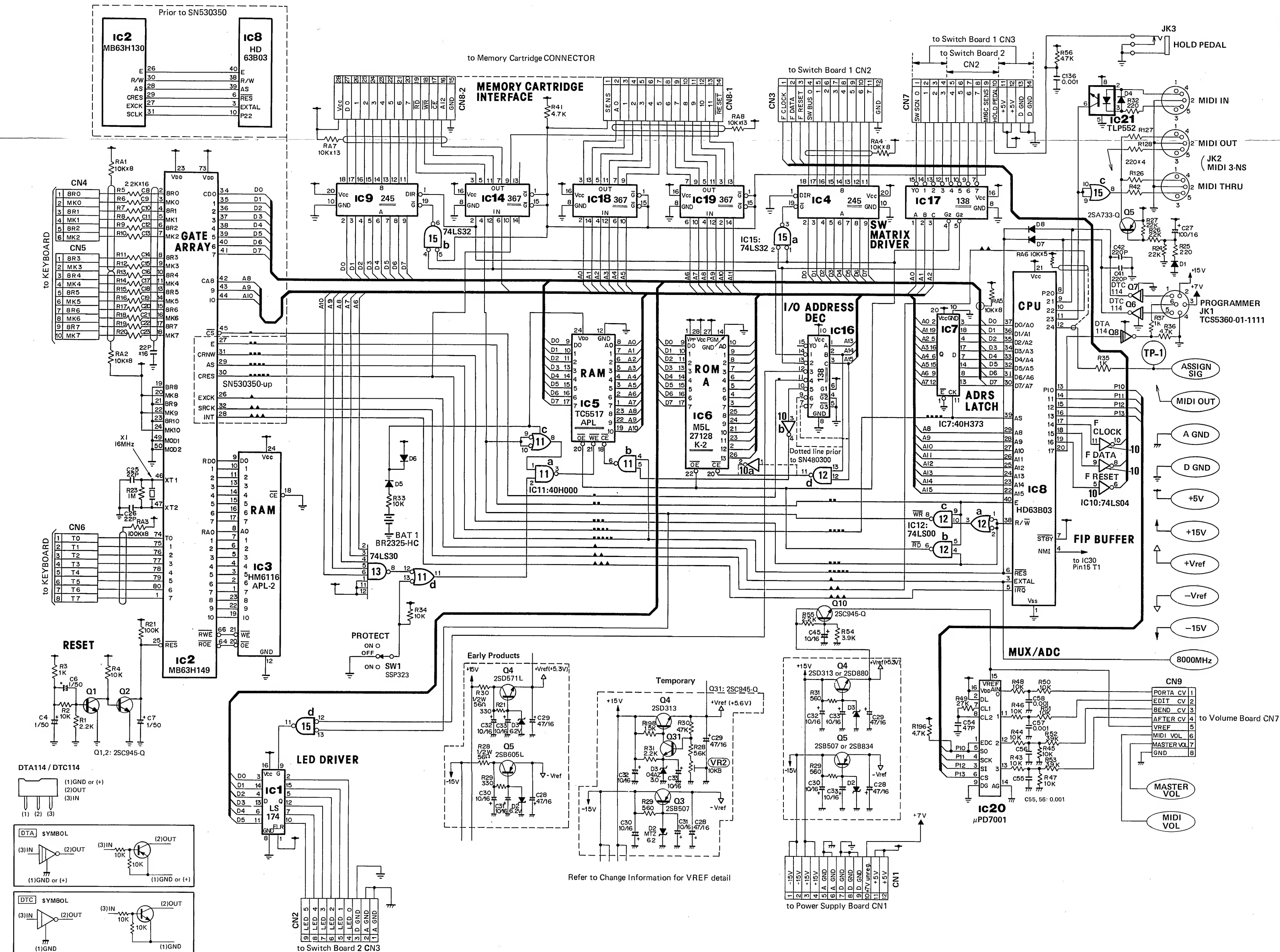


O  
N  
M  
L  
K  
J  
I  
H  
G  
F  
E  
D  
C  
B  
A

**COMPONENTS LOCATED ON SCHEMATIC DIAGRAM (ASSIGNER)**

For the Q's and IC's not listed here, see table on P.11.

IC	Q
CIRCUIT NO.	SCHEM LOCATION
1	C-5
2	E-3
3	G-5
4	L-13
5	I-10
6	I-12
7	J-15
8	H-17
9	L-6
10a	H-12
10b	I-13
10c	H-18
10d	H-18
10e	I-18
11a	H-9
11b	H-10
11c	H-9
11d	F-7
12	H-13
13	G-6
14	L-8
15a	L-13
15b	L-7
15c	L-18
15d	D-5
16	J-14
17	L-15
18	L-10
19	L-12
20	C-16
21	N-18



Refer to Change Information for VREF detail



# MAIN BOARD (PARTIAL)

76149060

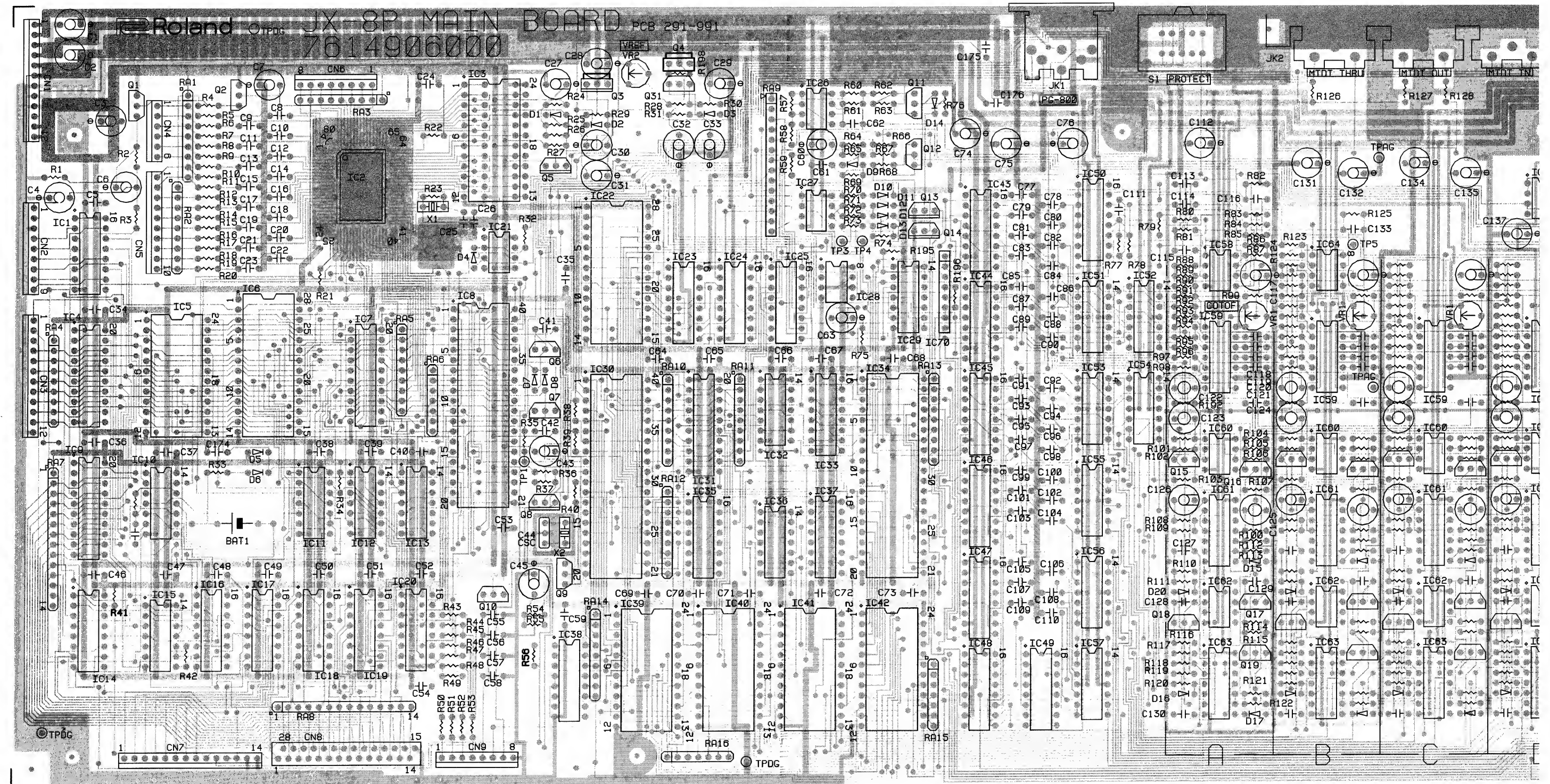
(pcb 2291399102) or

(pcb 2291399104) SN530350-up

## LAYOUT 2291399104

For checking paths to Gate Array of MB63H130 on PCB 22913102, trace tracks on the actual PCB referring to the boxed diagrams on page 8.

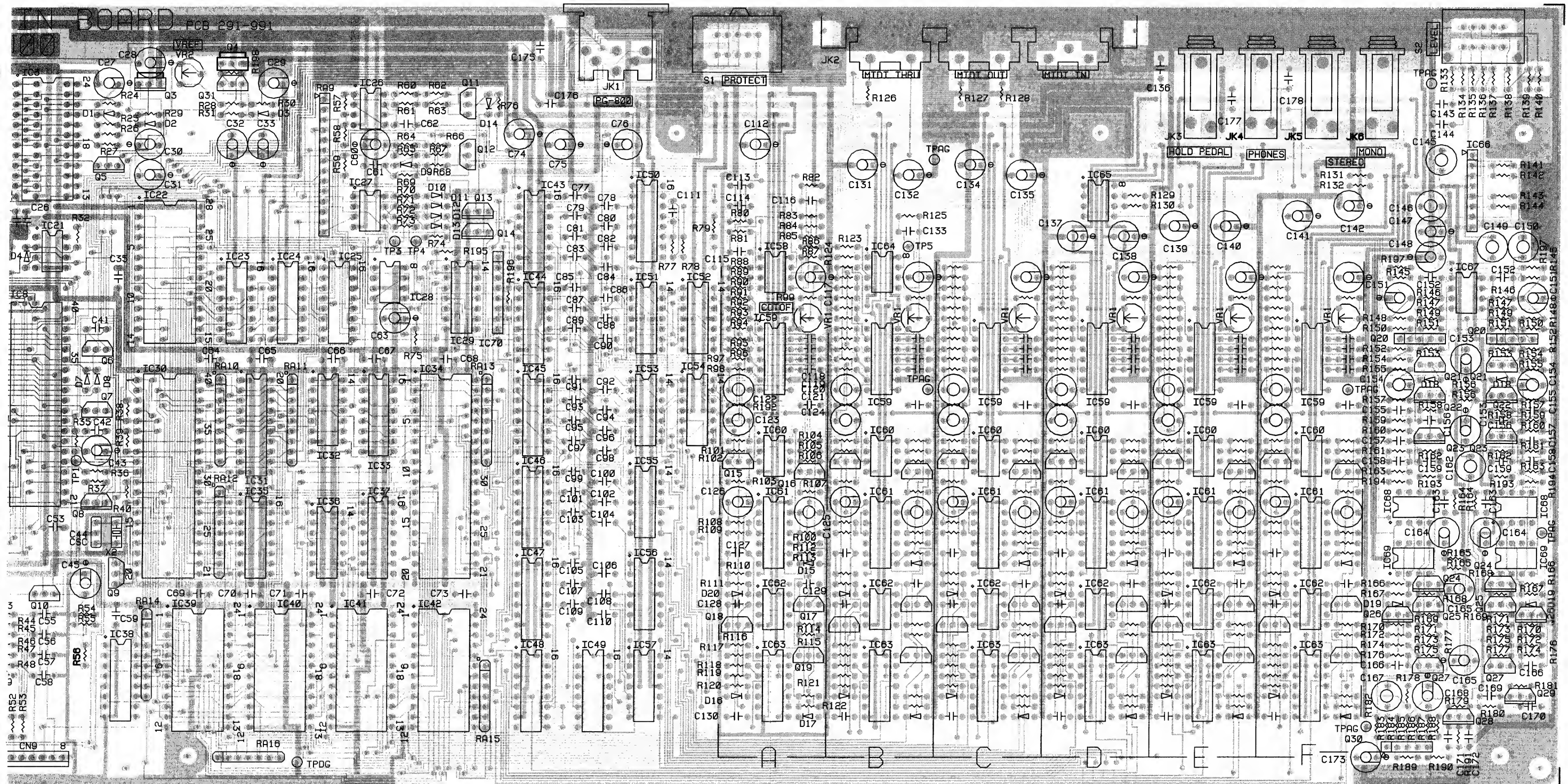
Continued overleaf





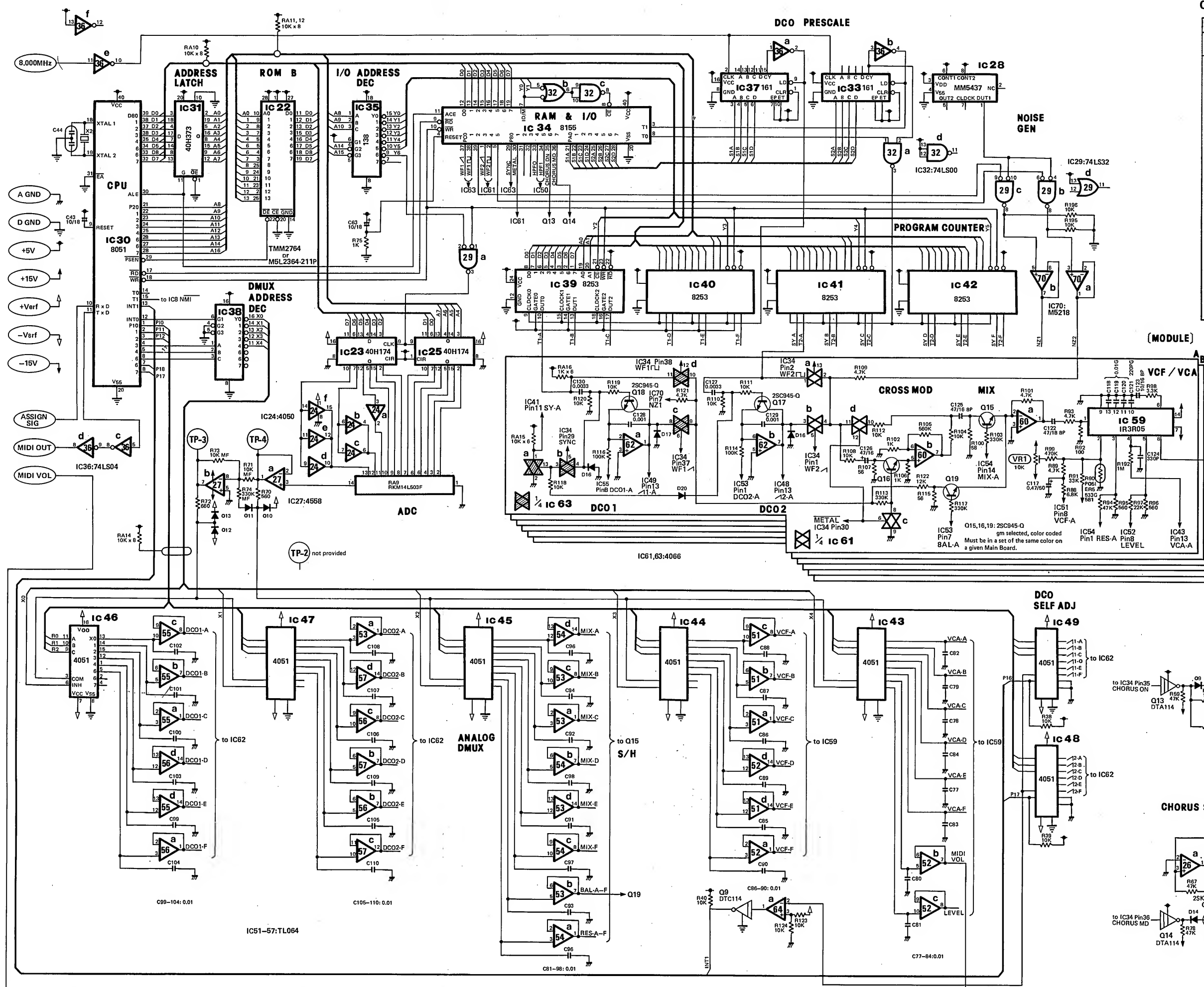
## 76149060

(pcb 2291399102) or  
(pcb 2291399104) SN530350-up



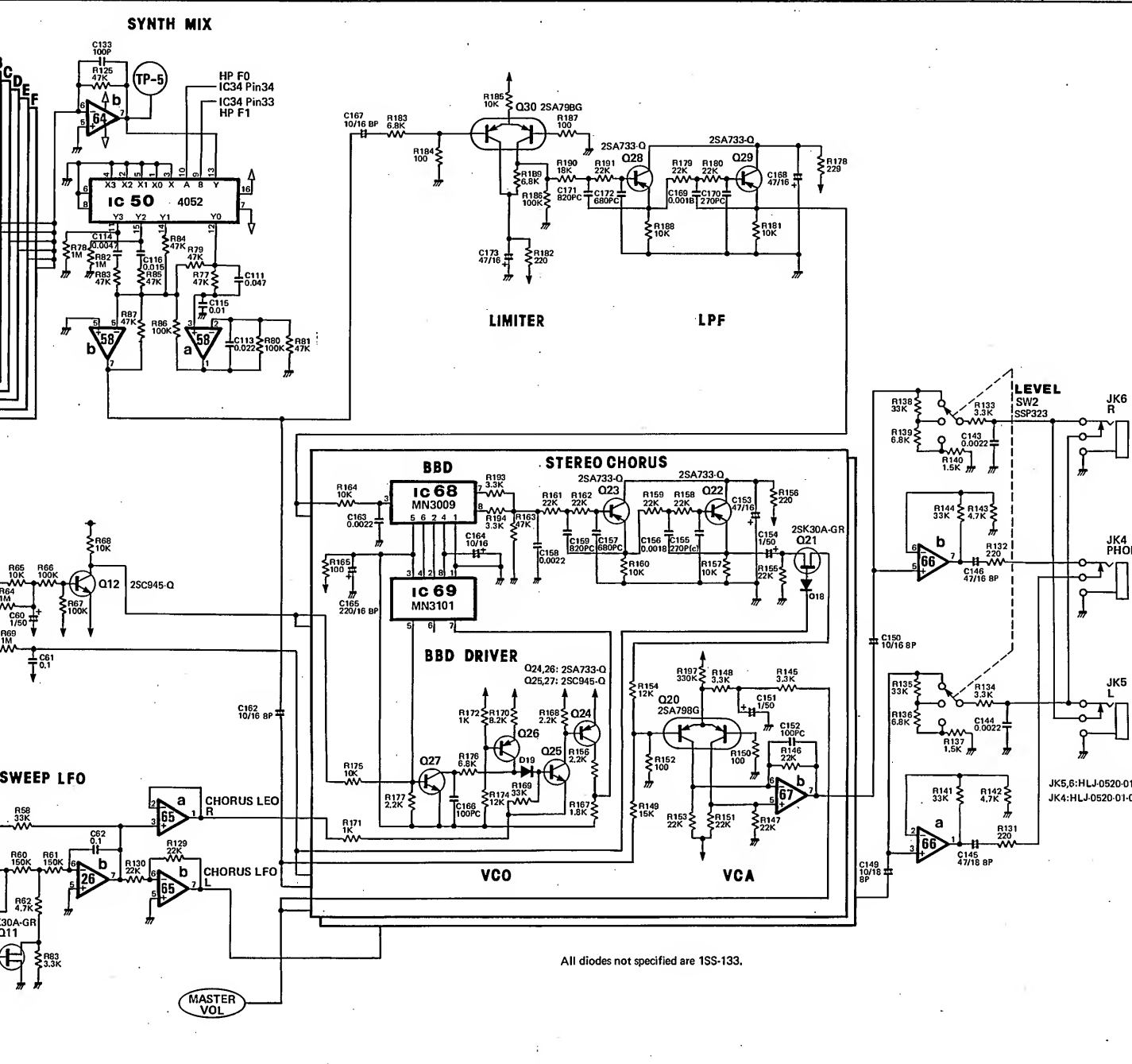


R  
Q  
P  
O  
N  
M  
L  
K  
J  
I  
H  
G  
F  
E  
D  
C  
B  
A



COMPONENTS LOCATED ON SCHEMATIC DIAGRAM (SYNTHESIZER) For the Q's and IC's not listed here, see table on P.8.

CIRCUIT NO.	SCHEM LOCATION	CIRCUIT NO.	SCHEM LOCATION	CIRCUIT NO.	SCHEM LOCATION	CIRCUIT NO.	SCHEM LOCATION	CIRCUIT NO.	SCHEM LOCATION	CIRCUIT NO.	SCHEM LOCATION	CIRCUIT NO.	SCHEM LOCATION
22	F-6	32b	Q-11	46	G-3	55a	E-4	62a	J-12	9	B-14		
23	L-7	32c	Q-11	47	G-6	55b	F-4	62b	J-15	11	B-23		
24a	K-8	32d	not used	48	E-20	55c	G-4	63a	J-10	12	F-23		
24b	K-7	33	Q-16	49	G-20	55d	D-4	63b	J-11	13	F-22		
24c	J-7	34	P-11	50	J-24	56a	C-4	63c	K-13	14	B-22		
24d	J-7	35	P-8	51a	E-14	56b	D-7	63d	L-13	15	K-19		
24e	J-7	36a	Q-15	51b	F-14	56c	E-7	64a	B-15	16	J-17		
24f	K-7	36b	Q-17	51c	G-14	56d	E-4	64b	K-23	17	K-15		
25	L-9	36c	Q-3	51d	D-14	57a	G-7	65a	D-24	18	K-12		
26a	C-22	36d	Q-3	52a	C-14	57b	E-7	65b	C-24	19	J-18		
26b	C-23	36e	Q-3	52b	C-17	57c	C-7	66a	D-33	20	E-30		
27a	J-6	36f	not used	52c	B-17	57d	F-7	66b	G-33	21	F-31		
27b	J-5	37	Q-14	52d	E-14	58a	L-25	67b	D-31	22	G-30		
28	Q-18	38	N-5	53a	B-11	58b	L-24	68	G-27	23	G-29		
29a	not used	39	M-11	53b	B-11	59	K-21	69	F-27	24	E-29		
29b	Q-20	40	M-14	53c	F-11	60a	K-19	70a	M-20	25	D-29		
29c	Q-19	41	N-16	53d	D-11	60b	J-17	70b	N-20	26	D-28		
29d	Q-20	42	M-18	54a	E-11	61a	L-15			27	D-27		
30	N-3	43	G-17	54b	E-11	61b	K-15			28	K-29		
31	F-4	44	G-13	54c	C-11	61c	L-17			29	K-31		
32a	F-17	45	G-10	54d	G-11	61d	K-16			30	K-28		

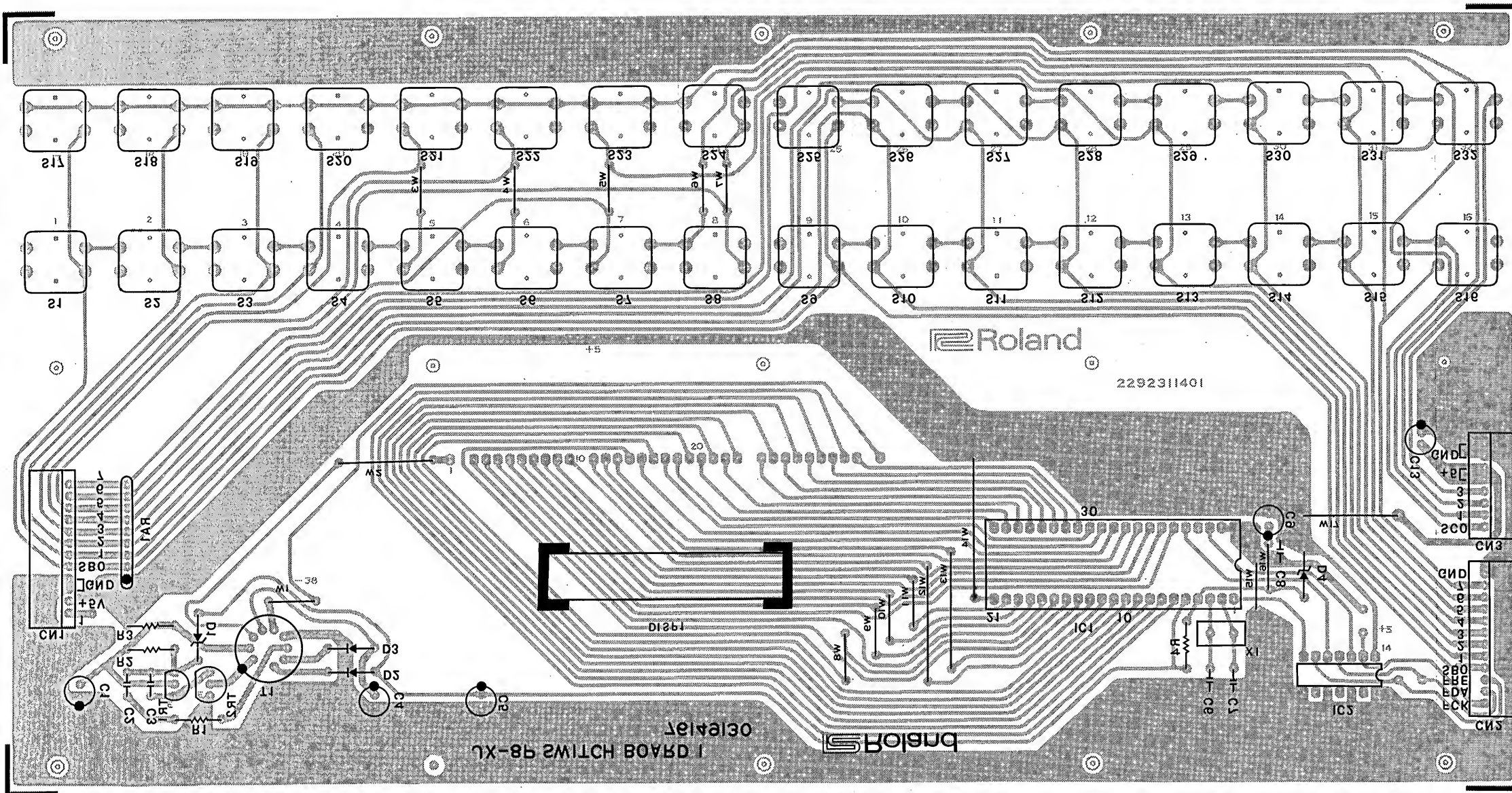


MAIN BOARD  
SYNTHESIZER

R  
Q  
P  
O  
N  
M  
L  
K  
J  
I  
H  
G  
F  
E  
D  
C  
B  
A

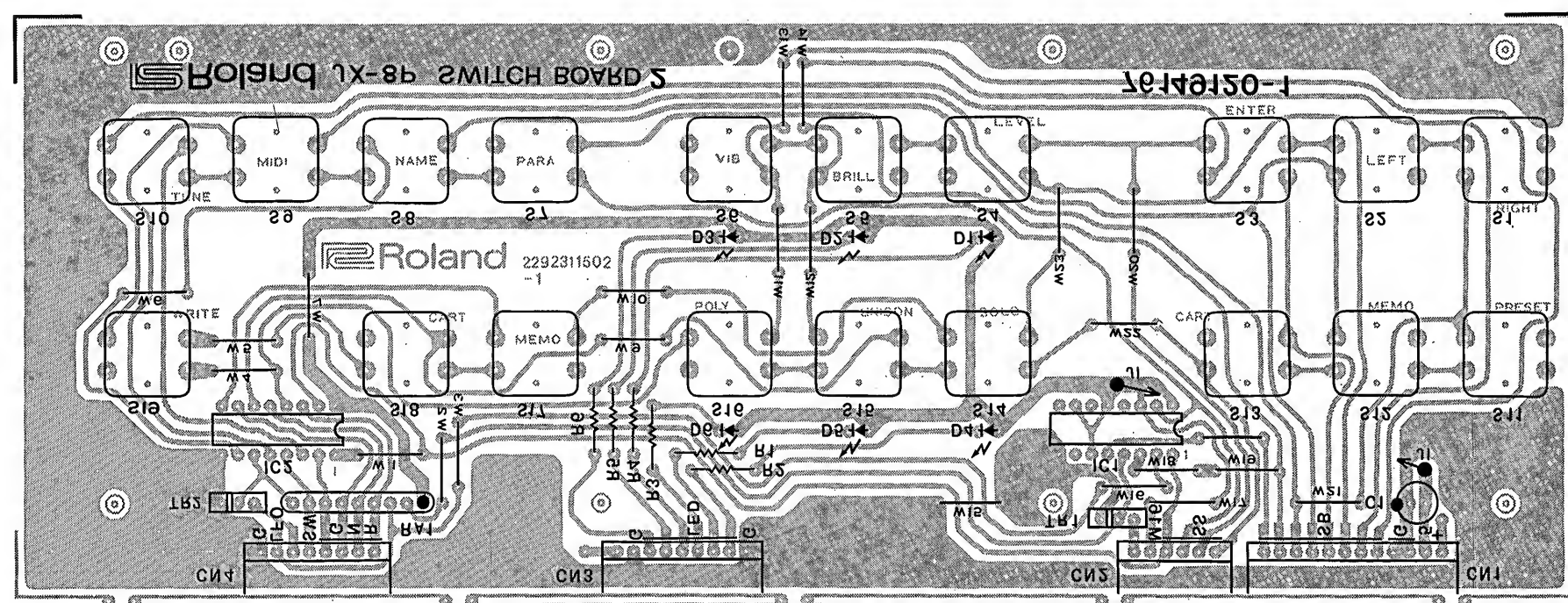


**76149130** (pcb 2292311401)

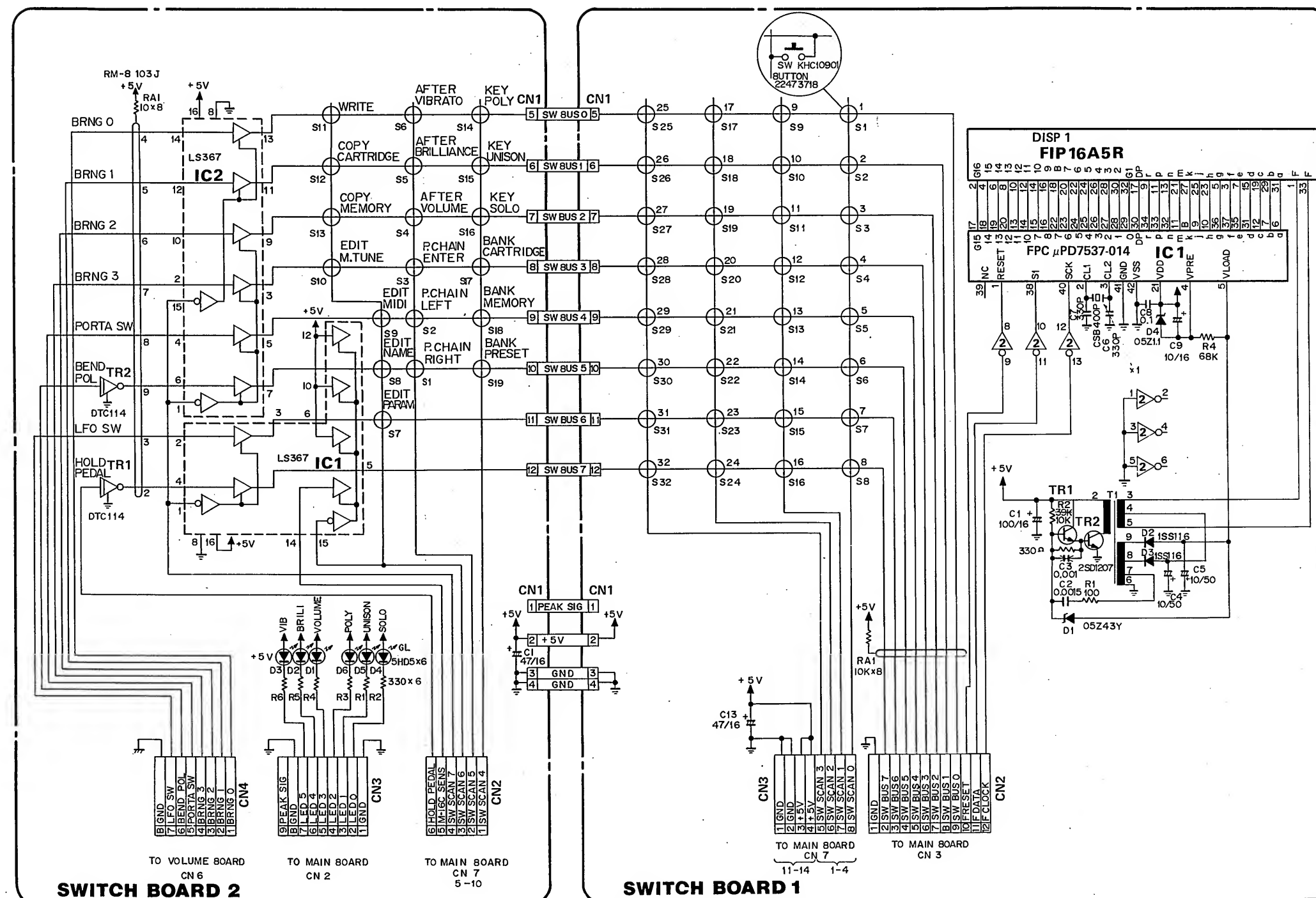


## 2

Replacement for Switch Board will be in a set of Switch Board 2, Volume Board and Filter Board.



View from foil side

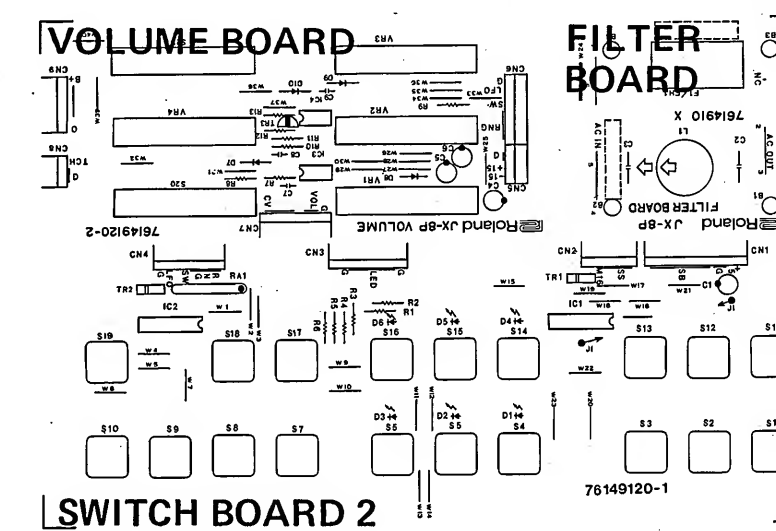


## Replacement For SWITCH BOARD 2 VOLUME BOARD FILTER BOARD

These three PCBs will be supplied in a set of three PCBs assembled on a splittable PCB as shown here.

Representative: Switch Board 2 76149100.

When ordering, specify the line voltage.



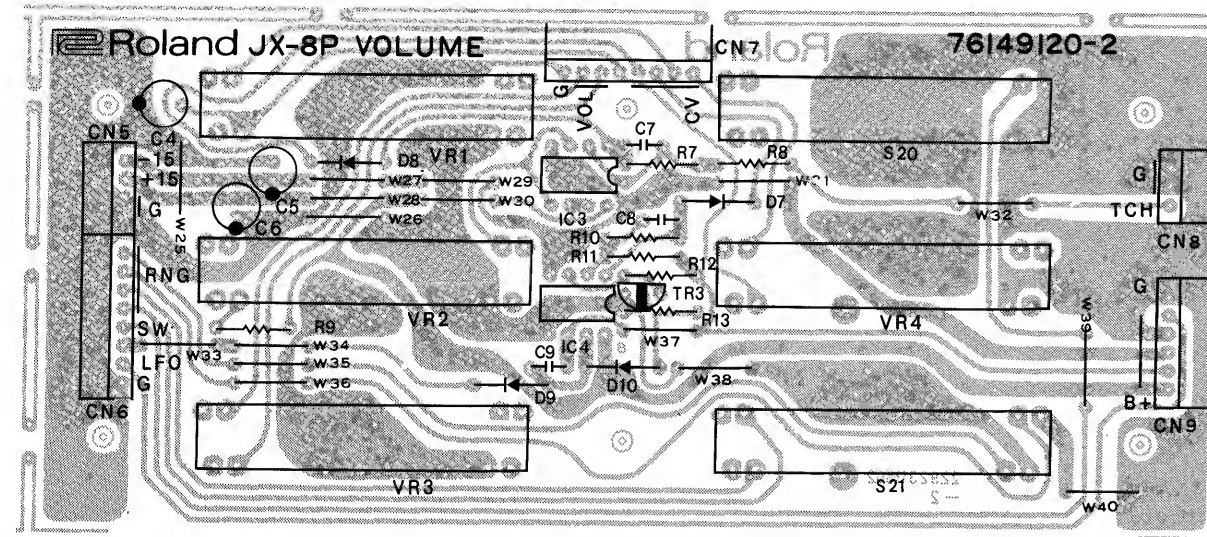


# VOLUME BOARD

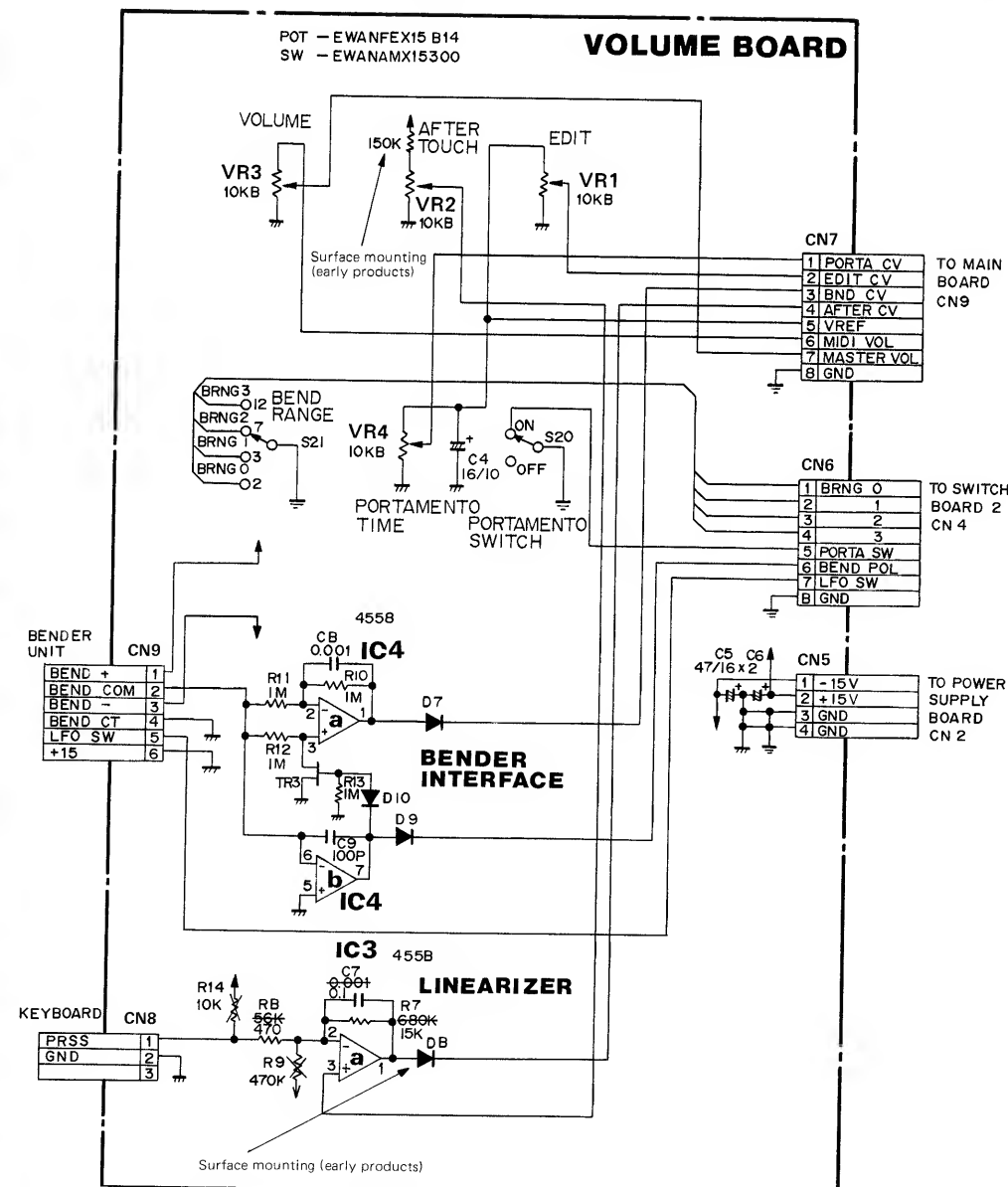
76149120-2

(pcb 2292311502-2)

Replacement for Volume Board will be supplied in the splittable PCB set of Volume Board, Switch Board 2 and Filter Board.

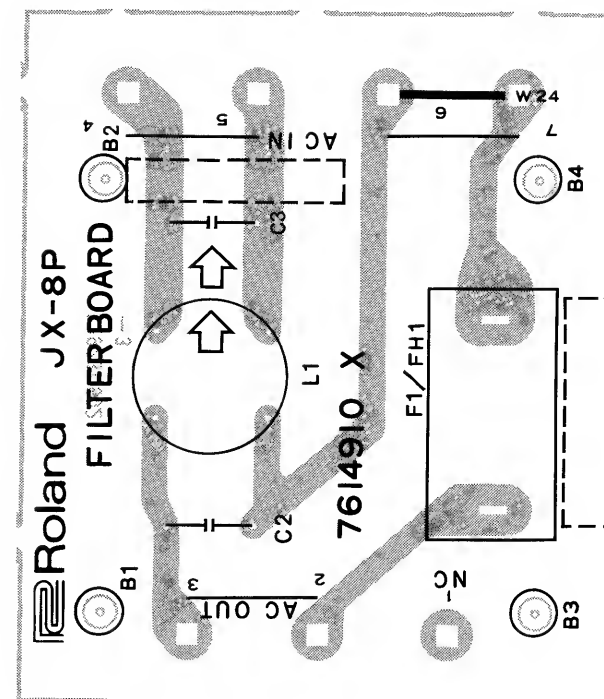


View from foil side

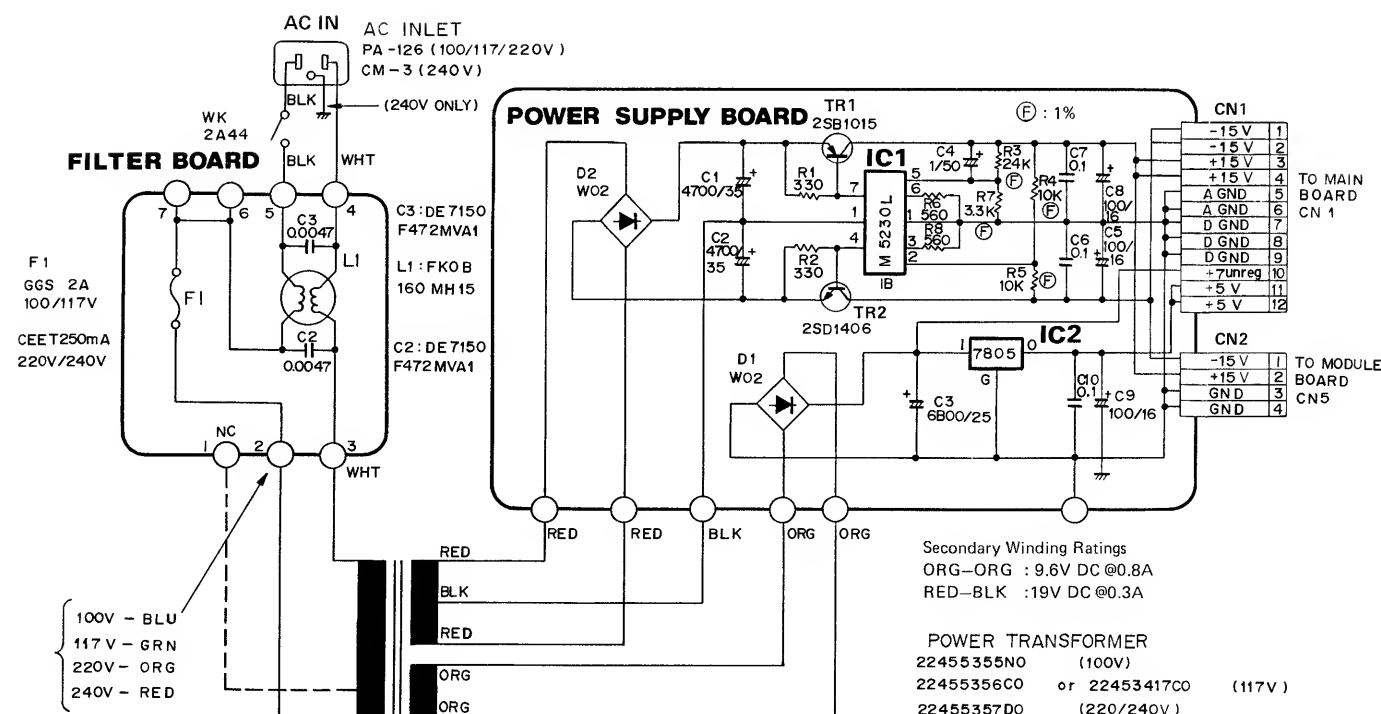


# FILTER BOARD

7614910X (pcb 2292311502-3)

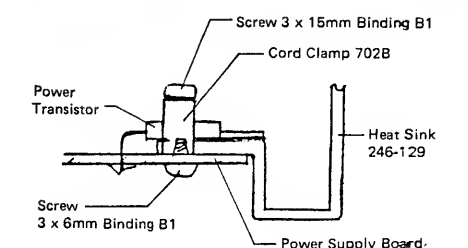
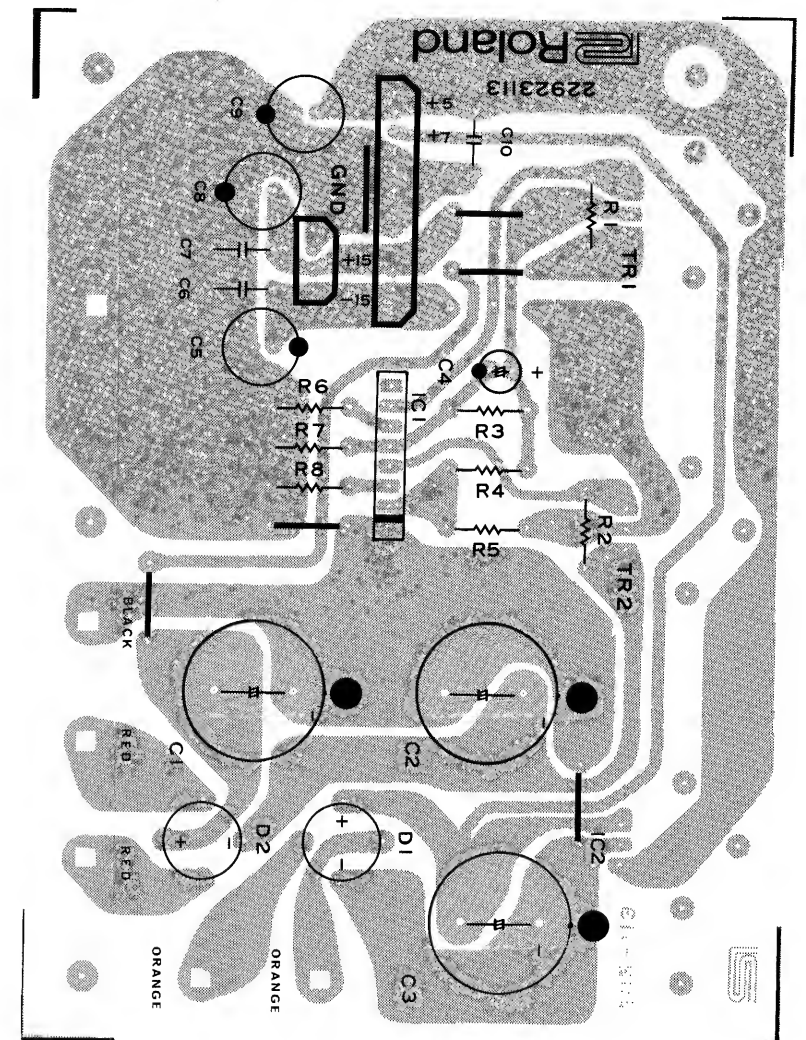


Replacement for Filter Board will be supplied in the splittable PCB set of Filter Board, Volume Board and Switch Board 2.



# POWER SUPPLY BOARD

76149180 (pcb 22923112)





## MIDI IMPLEMENTATION

## 1. TRANSMITTED DATA

Status	Second	Third	Description	
1001 nnnn	0kkk kkkk	0000 0000	Note OFF kkkkkkk = 36 - 96	
1001 nnnn	0kkk kkkk	0vvv vvvv	Note ON kkkkkkk = 36 - 96 vvvvvvv = 1 - 127	
1011 nnnn	0000 0001	0vvv vvvv	Modulation vvvvvvv = 0 - 127	*1
1011 nnnn	0000 0101	0vvv vvvv	Portamento time vvvvvvv = 0 - 127	*1
1011 nnnn	0100 0000	0xxx xxxx	Hold ON xxxxxxx = 1 - 127	*1
1011 nnnn	0100 0000	0000 0000	Hold OFF	*1
1011 nnnn	0100 0001	0xxx xxxx	Portamento ON xxxxxxx = 1 - 127	*1
1011 nnnn	0100 0001	0000 0000	Portamento OFF	*1
1100 nnnn	0ppp pppp		Program Change ppppppp = 0 - 127	*1, *2
1101 nnnn	0vvv vvvv		Channel After Touch vvvvvvv = 0 - 127	*1
1110 nnnn	0000 0000	0vvv vvvv	Pitch Bender Change	*1
1011 nnnn	0111 1011	0000 0000	ALL NOTES OFF	
1011 nnnn	0111 1100	0000 0000	OMNI OFF	
1011 nnnn	0111 1101	0000 0000	OMNI ON	
1011 nnnn	0111 1111	0000 0000	POLY ON	
1111 1110			Active Sensing	*1

## Notes:

\*1 Transmitted if the corresponding function switch is ON.

\*2 0 - 31 : Internal Memory  
32 - 63 : Memory Cartridge  
64 - 95 : Preset #1  
96 - 127 : Preset #2

## 2. RECOGNIZED RECEIVE DATA

Status	Second	Third	Description	
1000 nnnn	0kkk kkkk	0vvv vvvv	Note OFF, velocity ignored	
1001 nnnn	0kkk kkkk	0000 0000	Note OFF kkkkkkk = 0 - 127 (21 - 108)	*1
1001 nnnn	0kkk kkkk	0vvv vvvv	Note ON kkkkkkk = 0 - 127 (21 - 108) vvvvvvv = 1 - 127	*1
1011 nnnn	0000 0001	0vvv vvvv	Modulation vvvvvvv = 0 - 127	*3
1011 nnnn	0000 0101	0vvv vvvv	Portamento time vvvvvvv = 0 - 127	*3
1011 nnnn	0000 0111	0vvv vvvv	Volume vvvvvvv = 0 - 127	*3
1011 nnnn	0100 0000	0xxx xxxx	Hold ON xxxxxxx = 1 - 127	*3
1011 nnnn	0100 0000	0000 0000	Hold OFF	*3
1011 nnnn	0100 0001	0xxx xxxx	Portamento ON xxxxxxx = 1 - 127	*3
1011 nnnn	0100 0001	0000 0000	Portamento OFF	*3
1100 nnnn	0ppp pppp		Program Change ppppppp = 0 - 127	*3, *4
1101 nnnn	0vvv vvvv		Channel After Touch vvvvvvv = 0 - 127	*3
1110 nnnn	0000 0000	0vvv vvvv	Pitch Bender Change	*3
1011 nnnn	0111 1010	0000 0000	Local OFF	
1011 nnnn	0111 1010	0111 1111	Local ON	
1011 nnnn	0111 1011	0000 0000	ALL NOTES OFF	
1011 nnnn	0111 1100	0000 0000	OMNI OFF	*2
1011 nnnn	0111 1101	0000 0000	OMNI ON	*2
1011 nnnn	0111 1110	0000 mmmm	ALL NOTES OFF (MONO ON)	*2
1011 nnnn	0111 1111	0000 0000	POLY ON	*2
1111 1110			Active Sensing	*3

## Notes:

\*1 Note numbers outside of the range 21 - 108 are transposed to the nearest octave inside this range.

\*2 Mode Messages (123 - 127) are also recognized as ALL NOTES OFF. MONO ON messages are ignored.

\*3 Received if the corresponding function switch is ON.

\*4 0 - 31 : Internal Memory  
32 - 63 : Memory Cartridge  
64 - 95 : Preset #1  
96 - 127 : Preset #2

When the memory cartridge is not connected, 32 thru 63 are ignored.

## 3. TRANSMITTED EXCLUSIVE MESSAGES

3.1 All Tone Parameters (APR)  
When the 'Tone Button' is pressed.

Byte	Description
a 1111 0000	Exclusive status
b 0100 0001	Roland ID #
c 0011 0101	Operation code = APR (all parameters)
d 0000 nnnn	Unit # = MIDI basic channel, nnnn = 0 - 15 where nnnn + 1 = channel #
e 0010 0001	Format type (JX-8P)
f 0010 0000	Level # = 1
g 0000 0001	Group #
h 0vvv vvvv	Value (0 - 127)
:	In sequence (59 byte total)
1 1111 0111	End of System Exclusive

3.2 Individual Tone Parameter (IPR)  
When the Parameter is changed.

Byte	Description
a 1111 0000	Exclusive status
b 0100 0001	Roland ID #
c 0011 0110	Operation code = IPR (individual parameter)
d 0000 nnnn	Unit # = MIDI basic channel, nnnn = 0 - 15 where nnnn + 1 = channel #
e 0010 0001	Format type
f 0010 0000	Level # = 1
g 0000 0001	Group #
h 0ppp pppp	Parameter # (0 - 58)
i 0vvv vvvv	Value (0 - 127)
:	h and i (repetitively)
j 1111 0111	End of System Exclusive

## Note:

Parameter #	Function	Value
0-9	NAME-0..9	In ASCII
10	Undefined	
11	DCO-1 RANGE	0 - 31 = 16' 32 - 63 = 8' 64 - 95 = 4' 96 - 127 = 2'
12	DCO-1 WAVEFORM	0 - 31 = Noise 32 - 63 = Sawtooth Wave 64 - 95 = Pulse Wave 96 - 127 = Square Wave
13	DCO-1 TUNE	0 - 127 (-1 oct -- +1 oct)
14	DCO-1 LFO MOD DEPTH	0 - 127
15	DCO-1 ENV MOD DEPTH	0 - 127
16	DCO-2 RANGE	0 - 31 = 16' 32 - 63 = 8' 64 - 95 = 4' 96 - 127 = 2'
17	DCO-2 WAVEFORM	0 - 31 = Noise 32 - 63 = Sawtooth Wave 64 - 95 = Pulse Wave 96 - 127 = Square Wave
18	DCO-2 CROSSMOD	0 - 31 = OFF 32 - 63 = SYNC 1 64 - 95 = SYNC 2 96 - 127 = XMOD (cross modulation)
19	DCO-2 TUNE	0 - 127 (-1 oct -- +1 oct)
20	DCO-2 FINE TUNE	0 - 127 (-50 cent -- +50 cent)
21	DCO-2 LFO MOD DEPTH	0 - 127
22	DCO-1 ENV MOD DEPTH	0 - 127
23	Undefined	
24	Undefined	
25	Undefined	
26	DCO DYNAMICS	0 - 31 = OFF 32 - 63 = 1 64 - 95 = 2 96 - 127 = 3
27	DCO ENV MODE	0 - 31 = ENV-2 Inverted 32 - 63 = ENV-2 Normal 64 - 95 = ENV-1 Inverted 96 - 127 = ENV-1 Normal
28	MIXER DCO-1	0 - 127
29	MIXER DCO-2	0 - 127
30	MIXER ENV MOD DEPTH	0 - 127
31	MIXER DYNAMICS	0 - 31 = OFF 32 - 63 = 1 64 - 95 = 2 96 - 127 = 3
32	MIXER ENV MODE	0 - 31 = ENV-2 Inverted 32 - 63 = ENV-2 Normal 64 - 95 = ENV-1 Inverted 96 - 127 = ENV-1 Normal
33	HPF CUTOFF FREQ	0 - 31 = 0 32 - 63 = 1 64 - 95 = 2 96 - 127 = 3
34	VCF CUTOFF FREQ	0 - 127
35	VCF RESONANCE	0 - 127
36	VCF LFO MOD DEPTH	0 - 127
37	VCF ENV MOD DEPTH	0 - 127
38	VCF KEY FOLLOW	0 - 127
39	VCF DYNAMICS	0 - 31 = OFF 32 - 63 = 1 64 - 95 = 2 96 - 127 = 3
40	VCF ENV MODE	0 - 31 = ENV-2 Inverted 32 - 63 = ENV-2 Normal 64 - 95 = ENV-1 Inverted 96 - 127 = ENV-1 Normal
41	VCA LEVEL	0 - 127
42	VCA DYNAMICS	0 - 31 = OFF 32 - 63 = 1 64 - 95 = 2 96 - 127 = 3
43	CHORUS	0 - 31 = OFF 32 - 63 = 1 64 - 127 = 2

44	LFO WAVEFORM	0 - 31 = Random 32 - 63 = Square Wave 64 - 127 = Triangle Wave
45	LFO DELAY TIME	0 - 127
46	LFO RATE	0 - 127
47	ENV-1 ATTACK TIME	0 - 127
48	ENV-1 DECAY TIME	0 - 127
49	ENV-1 SUSTAIN LEVEL	0 - 127
50	ENV-1 RELEASE TIME	0 - 127
51	ENV-1 KEY FOLLOW	0 - 31 = OFF 32 - 63 = 1 64 - 95 = 2 96 - 127 = 3
52	ENV-2 ATTACK TIME	0 - 127
53	ENV-2 DECAY TIME	0 - 127
54	ENV-2 SUSTAIN LEVEL	0 - 127
55	ENV-2 RELEASE TIME	0 - 127
56	ENV-2 KEY FOLLOW	0 - 31 = OFF 32 - 63 = 1 64 - 95 = 2 96 - 127 = 3
57	Undefined	
58	VCA ENV MODE	0 - 63 = Gate 64 - 127 = ENV-2 Normal

3.3 All Patch Parameters (APR)  
When the 'Patch Chain' button is pressed.

Byte	Description
a 1111 0000	Exclusive status
b 0100 0001	Roland ID #
c 0011 0101	Operation code = APR (all parameters)
d 0000 nnnn	Unit # = MIDI basic channel, nnnn = 0 - 15 where nnnn + 1 = channel #
e 0010 0001	Format type (JX-8P)
f 0011 0000	Level # = 2
g 0000 0001	Group #
h 0vvv vvvv	Value (0 - 127)
:	In sequence (9 byte total)
i 1111 0111	End of System Exclusive

3.4 Individual Patch Parameter (IPR)  
When the Patch Parameter is changed.

Byte	Description
a 1111 0000	Exclusive status
b 0100 0001	Roland ID #
c 0011 0110	Operation code = IPR (individual parameter)
d 0000 nnnn	Unit # = MIDI basic channel, nnnn = 0 - 15 where nnnn + 1 = channel #
e 0010 0001	Format type
f 0011 0000	Level # = 2
g 0000 0001	Group #
h 0ppp pppp	Parameter # (0 - 8)
i 0vvv vvvv	Value (0 - 127)
:	h and i (repetitively)
j 1111 0111	End of System Exclusive

## Note:

Parameter #	Function	Value
0	BEND RANGE	0 = 2 Semi Tones 32 = 3 Semi Tones 64 = 4 Semi Tones 96 = 7 Semi Tones
1	PORTAMENTO TIME	0 - 127
2	PORTAMENTO SW	0 = OFF 64 = ON
3	ASSIGN MODE SELECT	0 = Poly-1 1 = Unison-1 2 = Solo-1 4 = Poly-2 5 = Unison-2 6 = Solo-2
4	AFTER TOUCH SELECT	0 = OFF 1 = Vibrato ON 2 = Brilliance ON 4 = Volume ON
5	BEND LFO DEPTH	0 - 127
6	UNISON DETUNE	0 - 127
7	TONE NUMBER	0 - 31
8	BANK NUMBER	0 - 3

## 4. RECOGNIZED EXCLUSIVE MESSAGES

4.1 Program number (PGR)

Byte	Description
a 1111 0000	Exclusive status
b 0100 0001	Roland ID #
c 0011 0100	Operation code = PGR (program number)
d 0000 nnnn	Unit # = MIDI basic channel, nnnn = 0 - 15 where nnnn + 1 = channel #
e 0010 0001	Format type (JX-8P)
f 0010 0000	Level # = 1
g 0000 0001	Group #
h 0xxx xxxx	Extension of program #
i 0ppp pppp	Program # ('Program Number')
j 0fff ffff	Function #
k 1111 0111	End of System Exclusive

## Note:

Write data to memory with the program #  
xxx xxxx = 0  
fff ffff = 2  
Manual mode Flag  
xxx xxxx = 127  
fff ffff = 0

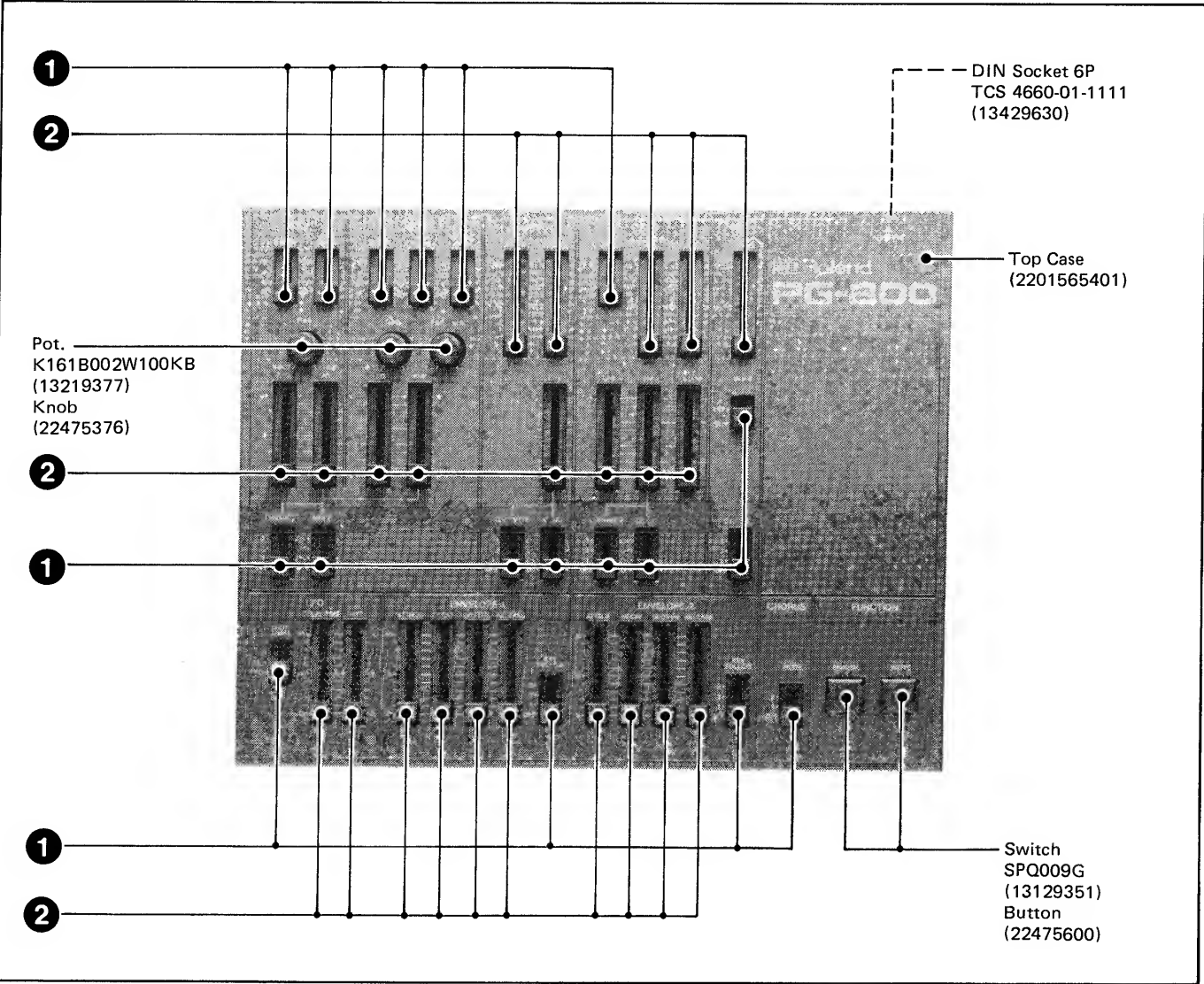
4.2 Other Exclusive messages described in section 3.

PG-800

SPECIFICATIONS

Dimensions265(W) x 215(D) x 27(H) mm  
10-7/16 x 8-7/16 x 1-1/16 in

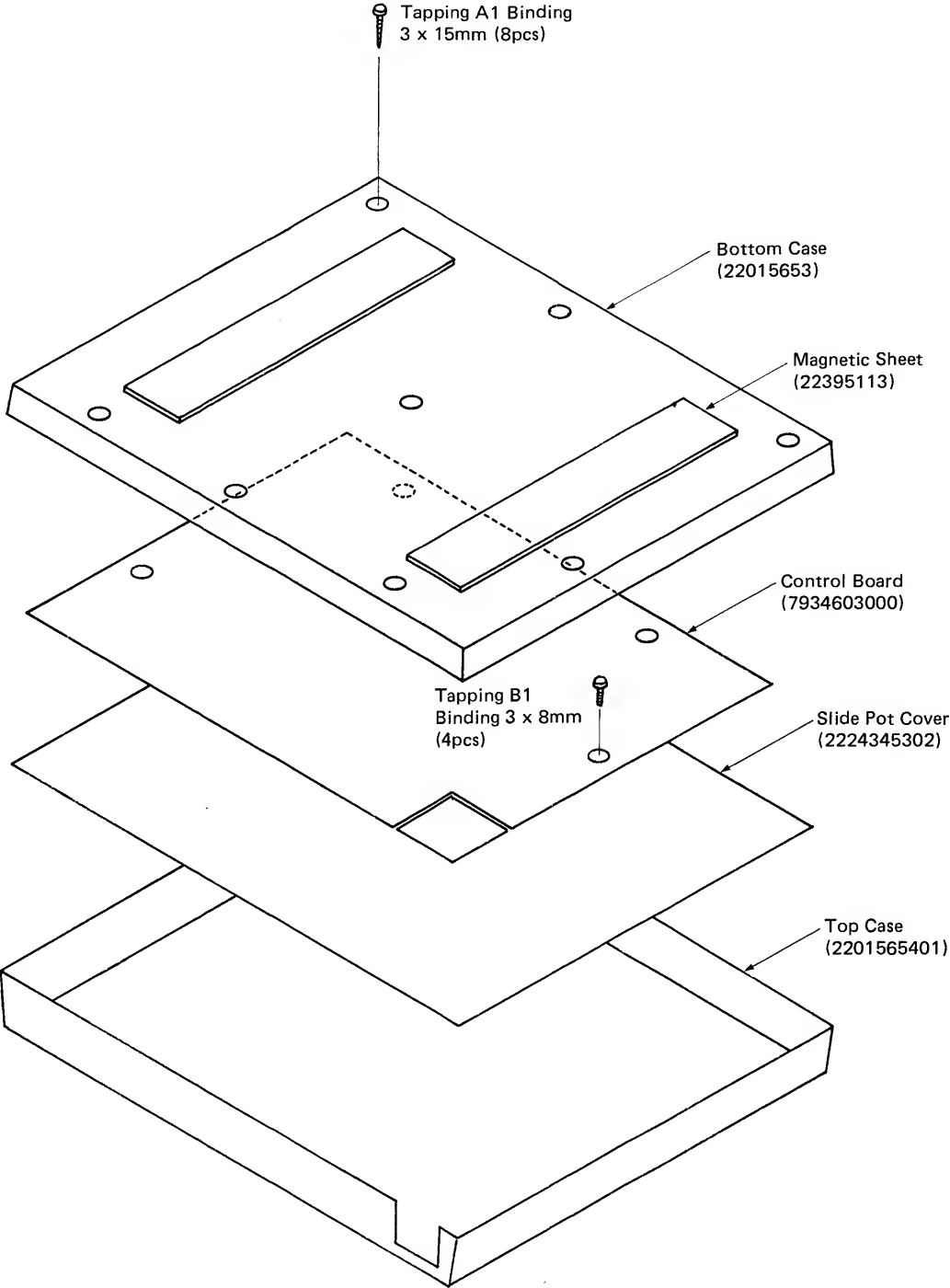
Weight680g / 1 lb 8 oz



- 1

Pot. EWAKF8X15B15 100KB (13379868)
- 2

Pot. EWANFEX15B15 100KB (13339453)
- Knob (22475375)



PARTS LIST (PG-800)

CASE			
2201565401	Top Case		
22015653	Bottom Case		
KNOB, BUTTON			
22475375	Knob	slide pot	
22475376	Knob	rotary pot	
22475600	Button	push switch	
SOCKET			
13429630	TCS4660-01-1111	6P DIN	
PCB			
7934603000	Control Board (pcb 2292312301)		
IC			
15179202	μPD8048HC-191		CPU
15129150	μPD7001C		A/D converter
15159113H0	HD14051BP		Single 8-CH MUX/DMUX

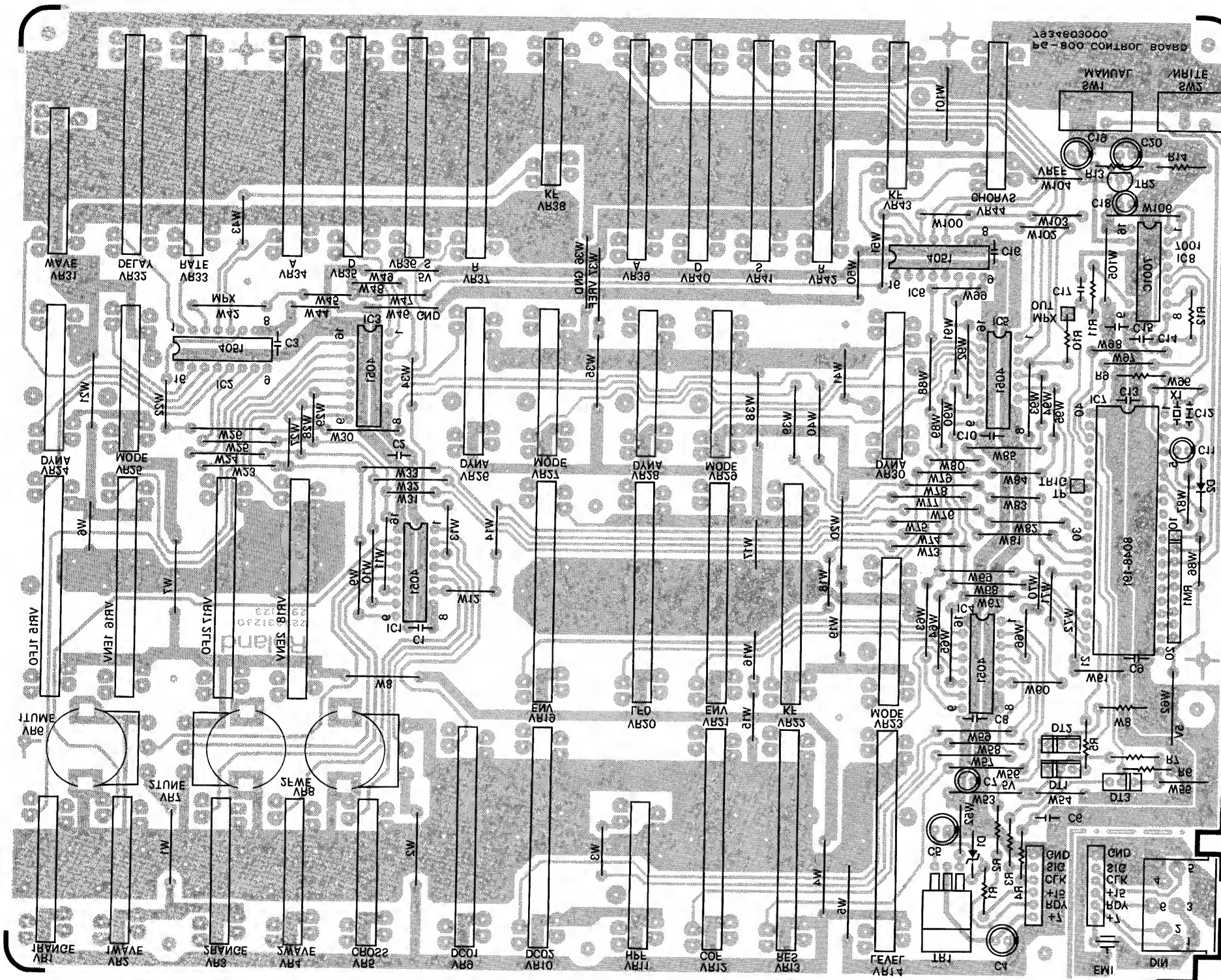
TRANSISTOR			
15129150	2SD880-Y		
15129107	2SC945-Q		
15119133	DTA114C		digital
15129150	DTC114C		digital
RESONATOR			
12389800	KMFC1005T1		6MHz, ceramic
POTENTIOMETER			
13219377	K161B002W-100KB		rotary
13339453	EWANFEX15-B15		slide 30mm travel
13339868	EWAKF8X15-B15		slide with click 15mm travel
SWITCH			
13129351	SPQ009G		
RESISTOR ARRAY			
13919310	EM-8 103J 10K x 8		

EMI FILTER			
13529105	DSS31055D223S		
DIODE			
15019103	1S2473		
150196130Z	05Z-5.6		zener
OTHERS			
2224345301	Slider Cover		
22395113	Magnetic Sheet		
22013703	Carrying Case		commercially available

# CONTROL BOARD

7934603000

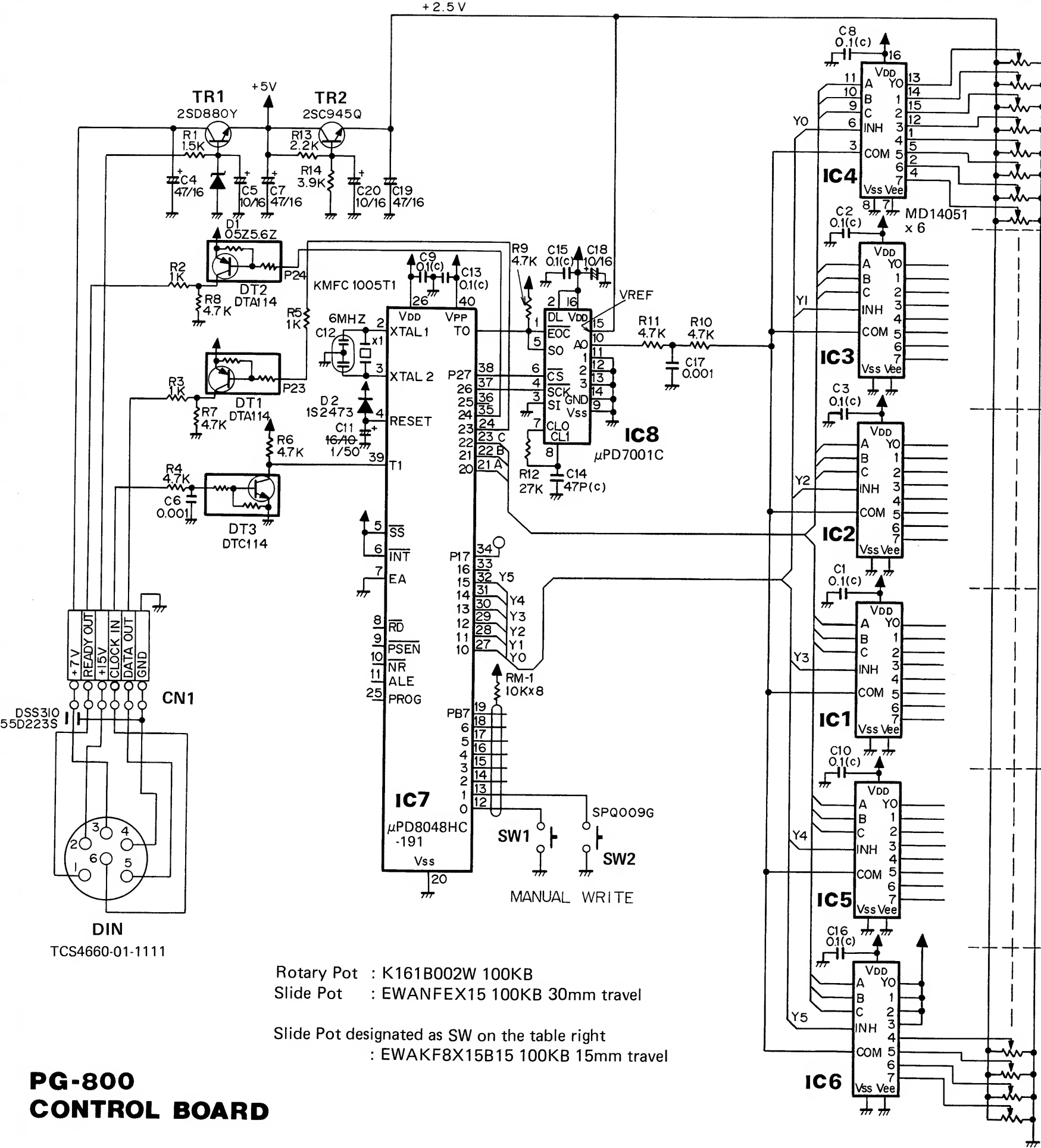
(pcb 2292312301)





1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

A  
B  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M  
N  
O  
P  
Q  
R  
S  
T  
U



Rotary Pot : K161B002W 100KB  
Slide Pot : EWANFEX15 100KB 30mm travel  
Slide Pot designated as SW on the table right  
: EWAKF8X15B15 100KB 15mm travel

PG-800  
CONTROL BOARD

LEGEND	VR	FUNCTION				
		POT SLIDER	POT ROTARY	SW 4P	SW 3P	SW 2P
VCF KEYF	VR22	<input type="radio"/>				
VCF ENV	VR21	<input type="radio"/>				
VCF LFO	VR20	<input type="radio"/>				
VCA LEVEL	VR14	<input type="radio"/>				
VCF RES	VR13	<input type="radio"/>				
VCF FREQ	VR12	<input type="radio"/>				
HPF	VR11			<input type="radio"/>		
MIX DC02	VR10	<input type="radio"/>				
DCO1 RANGE	VR1			<input type="radio"/>		
DCO1 ENV	VR16	<input type="radio"/>				
DCO2 LFO	VR17	<input type="radio"/>				
DCO2 ENV	VR18	<input type="radio"/>				
ENV1 D	VR35	<input type="radio"/>				
MIX DYNA	VR26			<input type="radio"/>		
ENV1 S	VR36	<input type="radio"/>				
ENV1 R	VR37	<input type="radio"/>				
DCO DYNA	VR24			<input type="radio"/>		
LFO WAVE	VR31				<input type="radio"/>	
DCO ENV MODE	VR25			<input type="radio"/>		
DCO1 LFO	VR15	<input type="radio"/>				
LFO DELAY	VR32	<input type="radio"/>				
ENV1 A	VR34	<input type="radio"/>				
LFO RATE	VR33	<input type="radio"/>				
ENV1 KEYF	VR38			<input type="radio"/>		
DCO2 TUNE	VR7		<input type="radio"/>			
DCO1 TUNE	VR6		<input type="radio"/>			
DCO1 WAVE	VR2			<input type="radio"/>		
DCO2 RANGE	VR3			<input type="radio"/>		
MIX DC01	VR9	<input type="radio"/>				
DC2 WAVE	VR4			<input type="radio"/>		
DCO2 FINE	VR8		<input type="radio"/>			
DCO2 CROSS	VR5			<input type="radio"/>		
VCF ENV MODE	VR29			<input type="radio"/>		
VCF DYNA	VR28			<input type="radio"/>		
MIX ENV MODE	VR27			<input type="radio"/>		
VCA DYNA	VR30			<input type="radio"/>		
ENV2 S	VR41	<input type="radio"/>				
MIX ENV	VR19	<input type="radio"/>				
ENV2 R	VR42	<input type="radio"/>				
VCA MODE	VR23					<input type="radio"/>
undefind						
undefind						
undefind						
undefind						
ENV2 KEYF	VR43			<input type="radio"/>		
ENV2 D	VR40	<input type="radio"/>				
CHORUS	VR44				<input type="radio"/>	
ENV2 A	VR39	<input type="radio"/>				